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CW Photo by S. Blakeney

An estimated 100,000 people crowded the exhibit floor at the 1983 National Computer Conference in Anaheim, Calif.

NCC '83 — Mainframes, Minis Regain Limelight

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — For those who remember past shows, the 1983 National Computer Conference had some elements of nostalgia — and it was a few major vendors who were responsible.

Just one year after the great microcomputer invasion dominated the show, mainframes and minicomputers from IBM and NCR Corp. recaptured the much-valued limelight by reviving a practice that had lapsed into disuse. Both firms used the show to introduce and spotlight new major systems: IBM unveiled its System/36, and NCR released seven additional models in its high-end mainframe line.

Even though there were no earth-shaking office automation or communications announcements, the integration of those increasingly kindred technologies was evident throughout the Anaheim Conven-

(Continued on Page 11)

Offers Upgrade to System/34 Users

IBM Unleashes Long-Awaited System/36

By Ed Scannell
CW Staff

ANAHEIM, Calif. — IBM last week announced its long-awaited solution to the upgrade problems that have plagued its System/34 users the last several years by unwrapping the System/36 — a minicomputer said to be hardware- and software-compatible with the widely used System/34.

The computer, which made its debut here at the National Computer Conference, is said to have up to twice the internal storage and one and a half times the direct storage capacity offered by the System/34. Depending on the application, the System/36 is also 20% to 70% faster than its predecessor, according to users who have reportedly beta tested the system.

The System/36 is also said to be compatible with about 150 IBM-generated application packages written for the System/34 and will be able to convert System/34 libraries in a minimal amount of time, an IBM spokesman said. It is not yet, however, compatible with the higher end System/38 minicomputer, an upgrade path problem the firm plans to address sometime in the future.

In addition to the System/36 unveiling, the company also introduced:

- A color graphics display, called the 5292 Model 2, which permits System/36 users to create a variety of charts, graphics and text fonts.
- A high-resolution printer intended for in-house publishing applications which employs electroerosion technology.
- A new version of the company's 8809 magnetic tape drive which can also be used with the System/36.
- Compatible office management, text management and business color graphics software.
- Enhanced software that allows the Personal Computer and the XT attached to the 5520 system to access the company's mainframes.

(Continued on Page 9)

CW Photo by S. Blakeney

NCC visitors walked the aisles in tent-like 'sprung structures.'

Bobby R. Inman, head of Microelectronics and Computer Technology Corp., discusses his goals with *Computerworld* — Page 15.

Basic Four Minis Grab Top Datapro Honors

By Ed Scannell
CW Staff

DELRAN, N.J. — Small business systems from the Basic Four Information Systems Division of Management Assistance, Inc. edged out systems made by Alpha Micro, Inc. for top honors in Datapro Research Corp.'s annual user survey of minicomputers and small business systems.

Systems from Altos Computer Systems, Inc. and Tandem Computers, Inc. finished in a tie for third place, while Hewlett-Packard Co. and Qantel Corp. tied for fourth place.

Last year's first-place winner, Point Four Data Corp., plummeted to No. 13 in this year's user ratings.

While only 36 Basic Four and Alpha Micro users took part in the survey, which drew 2,240 respondents, representing a total of 2,922 systems, the users scored their systems higher in terms of overall satisfaction than did users of minicomputers made by Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc. and IBM.

Basic Four and Alpha Micro users also reported the fewest number of problems, giving their machines top marks for ease of operation, ease of programming and reliability. In fact, Alpha Micro and Altos users were the only ones in this year's survey that unanimously agreed they would recommend their machines to other users.

(Continued on Page 40)

Industry Spotlight

Tech Advances Put Future Of 16-Bit Minis in Doubt

By Tom Henkel
CW Staff

Something is wrong in the land of 16-bit minicomputers. Although these types of systems are still in heavy use for a variety of applications, they have all but disappeared from many vendors' production lines.

Some industry sources contend the bottom is about to drop out of the once-fertile 16-bit mini market. Others, however, say it will be another two to five years before the once-mighty mini becomes an endangered species.

Computerworld last week interviewed marketing strategists from five vendor companies that have made a strong commitment to the 16-bit minicomputer market. While some indicated that sales of 16-bit minis are still reasonably healthy, all said their firms have already taken steps to develop products destined to replace their aging 16-bit mini lineups. All agreed the traditional 16-bit mini will eventually fall on hard times.

Data General Corp., for example, made its mark on the industry by building and selling stand-alone 16-bit minicomputers. Today, however,

(Continued on Page 4)

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Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700 Telex: 95-1153.

OTHER EDITORIAL OFFICES & SALES OFFICES:

New York: Suite 7G, 401 East 80th St., New York, N.Y. 10021 *Phone:* (212) 570-2135

West Coast: 257 Lytton Ave., Palo Alto, Calif. 94301 Phone: (415) 328-8064

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England: Bill Dunlop, Stephen Thomas [illegible] 343 [illegible] Rd., Islington, London EC1V [illegible] Phone [illegible]

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France: [illegible] Le Monde Informatique 42, Avenue Montaigne, 75008 Paris Phone [illegible]

Japan: [illegible] Computerworld Japan 7-4 [illegible] 1-Chome, Chuo-ku, Tokyo 104 Phone [illegible] Telex [illegible] Tokyo Representative Corp. [illegible] Bldg. 2-12, Kanda [illegible] Chiyoda-Ku, Tokyo 101 Phone [illegible] Telex [illegible]

Australia: Alan Power, Computerworld Pty. Ltd. 37-43 Alexander Street, Crows Nest, NSW 2065 Phone (02) 4390133, Telex SEECO AA25468

Brazil: [illegible] Data News Computerworld do Brasil, Servicos e Publicacoes Ltda. [illegible] 20031 Rio de Janeiro, RJ Brasil Phone [illegible] Telex [illegible]

Mexico: [illegible] Computerworld de Mexico, [illegible] Mexico City 7 D.F. Phone [illegible] Telex 1771300 ACHAME, 1777809 ACHAME

Spain: [illegible] Computerworld/Espana, Gravina, 13, Madrid 4 Phone 231 23-09 231-23-[illegible] 231 23-40 Telex [illegible]

Denmark: [illegible] Computerworld/Danmark, Gammel Strand [illegible] Copenhagen K. Phone [illegible] Telex [illegible]

Sweden: [illegible] Computerworld/Sweden, [illegible] 11520 Stockholm

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Despite Congressional Concern

FBI Brings Up Surveillance System

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Federal Bureau of Investigation has rejected the concerns of a Congressional oversight subcommittee and implemented a controversial automated surveillance system designed to help the Secret Service track individuals believed to be possibly dangerous to the president and other U.S. officials.

The Secret Service will list in the FBI's National Crime Information Center (NCIC) system the names of those the service believes may threaten persons under the agency's protection. At any one time, that list contains approximately 125 names, according to the Secret Service.

State and local law enforcement authorities routinely check with NCIC for information concerning individuals with whom they come into contact. When inquiries are made about those on the new file, the Secret Service will be notified by the FBI to help the service keep track of their movements and activities.

The inquiring law enforcement authorities would also be notified by NCIC that the Individuals are considered possibly dangerous. NCIC officiala said that to protect the inquiring officers, the federal agency is bound to notify them that persons they come in contact with may be dangerous.

Congressional Objections

Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Subcommittee on Civil and Constitutional Rights, as well as other aubcommittee members, objected to the use of NCIC for surveillance purposes. Civil liberties groups also warned that notifying local officials that individuals are on the Secret Service list could prejudice those officials although the individuals are not suspected of any crime by the Secret Service [CW, Feb. 14].

Late last month, Edwards approved the new file in principle, but asked the FBI to work with the subcommittee in drafting a law detailing the limits of the new file. FBI Director William H. Webster refused to cooperate with the subcommittee, citing a Justice Department legal opinion, also disputed by opponents of the new file, that the FBI already has the atatutory authority to implement the new system.

Following FBI implementation of the protective file, Edwards asked full Judiciary Committee Chairman Rep. Peter W. Rodino Jr. (D-N.J.) to introduce an amendment to the currently pending FBI spending authorization bill that would delay implementation of the system. That amendment was defeated during committee consideration of the bill.

Yoshida Pleads No Contest In IBM vs. Hitachi Case

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — The last remaining defendant in the IBM vs. Hitachi, Ltd. trade-secrets theft case has pleaded no contest to charges of conspiring to transport the industry giant's latest systems technology from the U.S. to Japan.

Tom Yoshida was one of 11 Hitachi employees or business associates charged late last June with conspiracy in the wake of a seven-month Federal Bureau of Investigation undercover investigation. All the other defendants, Including Hitachi Itself, had already pleaded guilty to the charges when Yoshida entered his plea on May 13 before U.S. District Court Judge Spencer Williams. Yoshida serves as president of NCL Data, Inc. in nearby Santa Clara.

in pleading no contest, Yoshida stopped ahort of admitting any wrongdoIng in the case, but exposed himself to possible legal penalties, which could include both a fine and a term in prison. Yoshida's sentencing is set to take place in mid-June.

Although the NCL Data president'a plea marks the end of the federal government's crimInal proceedings against Hitachi, the IBM trade-secrets theft case remains a long way from completion. Hitachi still faces a civil suit that IBM filed several months ago in connection with the Japanese theft plot, whose main targets appear to have been the company's Extended Architecture and 3080 series hardware designs.

Also still unresolved is a criminal case involving three non-Hitachi defendants, all of whom stand accused of participating in the same Japanese scheme as Hitachi and Yoshida.

This Week

IN DEPTH

NEWS

EDITORIAL

SOFTWARE & SERVICES

COMMUNICATIONS

SYSTEMS & PERIPHERALS

OFFICE AUTOMATION

COMPUTER INDUSTRY

4th-Generation Software
BREAKTHROUGH

Critics Argue BPSS Opposes Inquiry II

FCC Gives AT&T Green Light to Offer BPSS

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Enhanced services/systems vendors were reviewing their options last week after the Federal Communications Commission (FCC) gave AT&T a green light to offer Basic Packet Switching Service (BPSS) — the underpinning for American Bell, Inc.'s Advanced Information Systems (AIS)/Net 1000 and a host of other smart network services.

The commission rejected the original BPSS tariff last summer, primarily because Bell had not filed a 214 application requesting authority to offer a transmission service (AT&T insisted originally that BPSS was restricted to switching). The commission also criticized Bell's failure to permit sharing of BPSS switches, pointing out that this made BPSS appear to be tailored for a single customer — AT&T's separate subsidiary, American Bell.

Another commission concern involved the Dataphone Digital Service (DDS) channels that would be used to access BPSS switches. The charges were substantially less than those for similar DDS channels used to access the competing packet-switched networks, such as those DDS channels operated by Tymnet, Inc. and GTE Telenet Communications Corp.

The critics also contended BPSS was an enhanced communications service, as specified in the FCC's Second Computer Inquiry Decision, and, therefore, had to be offered by American Bell rather than by the phone company's Long Lines Division. The critics also objected to letting AT&T be the sole provider of the interface at the end of each BPSS access circuit.

When it turned down the original BPSS tariff last summer, the commission ignored the interface issue, but asked AT&T to address all other questions. Last December, the phone company submitted a new BPSS proposal; it included a 214 proposal, eliminated the discriminatory access channels and allowed sharing of BPSS switches.

But the new filing, like the original one, required BPSS customers employing broadband access channels to acquire the interfaces — variously known as "channel service units" or "Network Channel Terminating Equipment" — from the phone company. AT&T also continued to insist BPSS was basic, not enhanced.

The critics, led by GTE Telenet, IBM and the Computer and Business Equipment Manufacturers Association, argued that since X.25 is a set of protocols and BPSS supports the entire set, the service will provide protocol conversion on an end-to-end basis. Under the Computer II decision, any communications service that includes this function is enhanced.

According to AT&T, however, Computer II did not restrict the complexity of protocols that can be supported by basic services; it simply held that "a service is basic if customer data exits a carrier network on the same protocol it enters . . . BPSS conforms with this basic service definition."

Will 16-Bit Mini Be an Endangered Species?

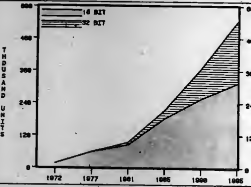
(Continued from Page 1)

the Westboro, Mass.-based company is downplaying the 16-bit machines as stand-alone small business systems, according to Don McDougall, director of DG's Technical Products Division. Sales of 16-bit minis like its S/120 and S/140 models are typically made only to users expanding their systems, McDougall added.

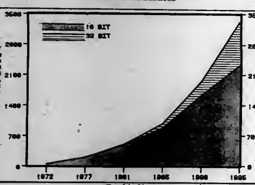
By announcing high-end 32-bit processors like the MV/4000, 6000, 8000 and 10000, DG has been able to overlap much of its 16-bit line with more powerful and cheaper products, McDougall contended. Furthermore, some industry watchers reportedly believe that DG will bring out a 16-bit microcomputer to augment its line of desktop Micronova products.

At Honeywell, Inc., Jim Pompa, associate group vice-president for the Marketing and Services Group, believes nothing is really wrong with 16-bit minis. Rather, he feels it is just that newer systems have been developed that offer better performance at a more attractive price. But Pompa insists a minicomputer that happens to employ a 16-bit architecture is not automatically outdated.

For example, Pompa said, Honeywell has made its 16-bit DPS 6 more flexible by altering its addressing format, allowing it to function with a 32-bit bus. As a result, "the DPS 6 will be around for a long time."



Annual Installations



Total in Use

Performance Gap Filled

Pompa added that in spite of the onslaught of 32-bit superminis and microcomputers, there is still a significant performance gap that can easily be filled by 16-bit minis.

There are other ways to enhance a system that may be hindered by older hardware architecture. For instance, Wang Laboratories, Inc. feels it has successfully bridged the gap between its 16- and 32-bit processors by developing a line of software that can be used on both types of processors, according to Charles Johnson, director of corporate systems. Therefore, if a user wants to upgrade to a more state-of-the-art hardware system, it does not have to scrap 16-bit machines to add 32-bit systems.

Johnson maintained that users in the minicomputer market are not really interested in how many bits a processor can address. Instead, they are looking for a solution to their business problems.

However, while noting that 16-bit minis "are still a mainstay product at Wang," Johnson admitted the firm plans to phase out its 16-bit minis.

At Hewlett-Packard

Hewlett-Packard Co., which also has positioned high-end 32-bit processors and low-end microcomputers around its 16-bit mini lineup, feels it is premature to write off 16-bit minis as viable products.

Microcomputers cannot answer all small business problems, claimed Richard Edwards, HP's strategic marketing manager. He pointed out that some DP executives refuse to allow microcomputers to be used in their data communications networks, and other users require more sophisticated graphics capabilities than microcomputers can deliver.

Furthermore, at the high end, not everyone needs the power of a 32-bit supermini. Sometimes a 16-bit mini can be a less expensive alternative, Edwards said.

One of the first companies to switch from a 16- to a 32-bit architecture was Perkin-Elmer Corp., which today considers 16-bit minis to be relics. According to John McNulty, deputy general manager of its Technical Systems Division, PE began offering its 32-bit architecture in 1973 in response to demands from scientific/engineering users for more power.

The New Jersey firm is a relative newcomer when it comes to using 32-bit processors for commercial applications. It introduced its first one, the 3205, earlier this month [CW, May 9]. In addition, the company just entered the microcomputer business with its Model 7500, a 16-bit desktop processor.

Death Rumors Premature?

Still, to modify a phrase made famous by Mark Twain, rumors about the death of 16-bit minis may be exaggerated. Even if the market for stand-alone 16-bit minis dwindles, there may still be life in 16-bit minis in such "hidden" applications as process and network control.

"I can't believe the 16-bit market is dead when you see the amount of advertising IBM is doing on the Series/1," DG's McDougall said. HP's Edwards agreed that minis may be experiencing a rebirth of sorts; he noted that specialized versions of the HP 1000 — a machine once popular as a stand-alone business system — are being repackaged for manufacturing applications.

Microprocessors and board-level processors will eventually nibble away at the specialized system market for 16-bit minis, but that will not occur until the next generation of specialized systems, McDougall believes. And that could extend the life of 16-bit minis by five or more years.

U.S.A.

1972: SyncSort was used by 2%. 1982: SyncSort was used by 75%.

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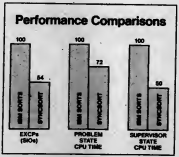
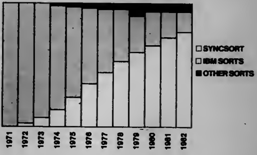

Performance Comparisons

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

THE FACTS: In a single decade, SyncSort has become the world's most popular independent software program.

In 1972, its first full year of production, SyncSort was used by only 2% of America's data processors. Today, it is the choice of 75% of the nation's major data processors, according to the most recent IDC sort survey. Just how steady this growth has been can be seen from the following charts:



PERCENT OF USERS IN THE U.S.*

Sort Used	1982	1980	1978
SyncSort	**75%**	**69%**	**54%**
IBM	**19%**	**25%**	**42%**
Other	**6%**	**6%**	**4%**

THE REASONS FOR SYNCSORT'S POPULARITY: In the past ten years, SyncSort has pioneered virtually every advance in sorting. Many of these innovations are now patented. As a result of this technological "sort gap," IBM sorts can no longer compete successfully with SyncSort in any of the following areas:

(1) PERFORMANCE: Because they operate more efficiently than IBM sorts, all three versions of SyncSort – OS, DOS and CMS – use fewer computer resources. The charts at left will give you an idea of the magnitude of these savings.

(2) PROGRAMMER PRODUCTIVITY: SyncSort drastically reduces the amount of time programmers have to devote to sorting. Using a combination of SyncSort's advanced features, it is often possible to reduce the amount of time required for simple reports from five programmer days to one.

(3) SERVICE: Our Technical Service specialists are the best in the field. They play a key role in shaping new SyncSort releases. And they handle more than 85% of all requests for sorting advice in less than 24 hours.

To those 6,500 users who made 1972-82 "the SyncSort Decade," our warm thanks. And to those who do not yet use SyncSort, it's never too late to reform your sorting!

*According to IDC's Sixth Annual Survey of Sort Programs Used in IBM OS and OS/VS Environments.

Few Micro Products

Mainframe Software Debuts Scarce

CW Photo by S. [illegible]

On the Way to See Apple'a Lisa

By Lois Paul
CW Staff

ANAHEIM, Calif. — Mainframe software product announcements were few and far beweween at the National Computer Conference here this year. Surprisingly, the show also did not see the introduction of many microcomputer software products.

Intel Corp. used the show as the vehicle for unwrapping enhancements to its System 2000 data base management system in conjunction with its Data Pipeline hardware and software products for linking mainframe data bases with personal computers. System 2000 runs on systems from IBM, Sperry Corp. and Control Data Corp.

CW At NCC

The Data Pipeline itself is built aroud Intel's Data Base Information System (Idis) 86/735, a microcomputer-based "traffic manager" designed to interpret, store and distribute mainframe data to and from terminals and personal computers.

The extensions to System 2000 reportedly provide a relational data base capability, graphics and a fourth-generation software architecture, System 2000 On-Line Operstion (Solo).

The Entry System model of System 2000 reportedly provides basic mainframe data management capabilities that support the mainframe-to-Idis 86/375 link.

The End-User System model handles information analysis and online query and update activities. For the IBM environment, the End-User model also includes a relatonal data base capability, graphics and Solo.

The third extension to System 2000 is the Development System model, which includes application development support and features the Idis 86/735 with mainframe data extract capabilities.

Pricing for the System 2000 extensions range from $40,000 for an Entry System model in the IBM DOS/VSE environment to $165,000 for an IBM VM/CMS Development System, according to Intel Corp., 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Arthur Andersen & Co. introduced a series of updates to its Method/1 project management and systems development methodology. These included methods for tying sytems into the organization's overall strategic plan, planning approaches to office automation and methods to document current information needs.

Method/1 is available for $35,000, according to the vendor at 69 W. Washington St., Chicago, Ill. 60602.

California Software Products, Inc. introduced Baby/34, a product designed to enable RPG-II applications systems and programs developed for the IBM System/34 to be transported as is to the IBM Personal Computer. The full conversion system will be available in September and is priced at $2,500. The stand-alone Runtime Execution Package is priced at $595.

The vendor also released an integrated package of 10 software aids and tools called California 10 Pak for the IBM Personal Computer. This package, which includes an identical keyboard/video interface, is available immediately for $100 from the vendor at 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.

Charles River Data Systems, Inc. announced the availability of the Unix System III tool set running under its Unos Unix-compatible operating system on Ita Universe 68 line of 32-bit computers. The license fee for Unix System III tools under Unos will be $1,200. Deliveries will be available in 60 to 90 days, the vendor said from 4 Tech Circle, Natick, Mass. 01760.

Learning Lab, a package designed to teach first-time users about the capabilities of their personal computer, was introduced by Epson America, Inc. for its Epson HX-20 portable computer. The package will be available this summer for $49.95, the vendor said from 3415 Kashiwa St., Torrance, Calif. 90505.

Attendees on Lookout For Micro-Mainframe Links

By Lois Paul
CW Staff

ANAHEIM, Calif. — Software products claiming to link microcomputers to mainframes were much-sought-after attractions last week at the National Computer Conference.

As a matter of fact, if any one of the vendor exhibits had included a big sign proclaiming "Micro-Mainframe Links Here," chances are it would have packed in the attendees.

A throng of interested attendees continually surrounded Visicorp's booth as representatives there demonstrated Visianswer, a micro-mainframe link software product the firm developed with Informatics General Corp.

Debbie Sheedy, a market analyst for Raytheon Data Systems Co., approached the demo area with pen and pencil in hand to learn more about the product because her firm is actively seeking a micro-mainframe link.

A number of users at her firm have distributed data bases on microcomputers such as Apple Computer, Inc. systems and IBM Personal Computers.

Centralized Data Base

Her group wants a centralized data base on ita IBM host mainframe so the data that is not on the micros can be shared among users. In addition, the firm wanta to solve storage problems microcomputer users have been experiencing

As manager of the microcomputer products group of Martin Marietta Data Systems Corp., Richard Windrow was interested in surveying available micro-mainframe link products.

In terms of microcomputers, his firm currently has "six of everything known to man and a few that aren't known," he said.

Currently, microcomputer users are employing a number of methods, including protocol converters and terminal emulators, to link to IBM mainframes.

"Really, all we are doing is making personal computers look like dumb terminals," he said.

Ongoing Debate

Although there is still an ongoing debate within Windrow's firm about exactly what type of link is desired, his feeling is that the ultimate goal is a virtual terminal link that is not yet available.

In looking at the existing offerings, Windrow is attempting to gauge the impact on the host computer of these various links, which is his major concern.

Another serious shopper was Richard Fried, marketing analyst for Vandekamps Frozen Foods. Fried's company buys large amounts of product data that is loaded into its mainframe data base.

"We are looking for some way to link something like a Visianswer to access this information from the mainframe," he explained.

Potential Problem

The potential problem is that the downloaded data would have to be scanned sequentially with existing micro-mainframe link products, he said.

Fried's firm is primarily interested in a system that would allow selective access of the downloaded data.

For example, data about a certain brsnd's activity in a particular city or area of the country would ideally be accessed from the mainframe data base, and this information would be transferred into a micro-based software product such as Visicorp's Visicalc for analysis.

Fried said he had made "one sweep of the hall" and was resting before his next attempt to find micro-mainframe link products. Based on the size of the crowd around offerings such as Visianswer, Fried's search would not be a solitary one.

Job Fair Shows Firms Not Seeking Entry-Level DPers

By Katherine Hafner
CW Staff

ANAHEIM, Calif. — High-technology companies may be hiring, but they are not looking for entry-level job applicants. That is the conclusion that came out of a two-day technical job fair held early last week just a mile from the National Computer Conference.

Booths at the fair were manned by representatives from leading computer firms and recruiters, all of them interested in attracting job hopefuls from the nearby NCC.

Sponsored by Business Peopie, Inc. of Minneapolis, the fair attracted some 2,000 job hopefuls the first day, ranging from bright-eyed college graduates to seasoned computer technicians exploring the job market.

Among the 55 companies participating in the fair were Xerox Corp., Apple Computer, Inc., Control Data Corp. and IBM.

Most of the recruiters were seeking applicants with about three years of computer experience, a criterion that proved frustrating for a good number of job seekers fresh out of school or in the midat of a career change.

Karl Honaker, a substitute teacher pondering a switch to computers, encountered nothing but discouragement from employment managers who have jobs to offer but no entry-level positions.

"I don't know anything about computers," explained another hopeful young man to a representative from Mohawk Data Sciences, Inc. of Los Gatos, Calif. "But I'm getting my Ph.D. in biomedical research and want to learn about computers."

"Sorry," said the representative, shaking her head. "Thanks for stopping by anyway."

Gerald Speno of Xerox Corp.'s Diablo Systems in Fremont, Calif., said that of the 400 people who had stopped by his booth so far for 40 openings, fewer than 50 were "reasonable matches."

"We're looking for hardware design engineers and some software people," Speno commented. "Many of the resumes we see are from people right out of school. Unfortunately, there's nothing for them."

Imlay Calls for U.S. DP Policy to Combat Japan

By Bill Laberis
CW Staff

CW
At NCC

ANAHEIM, Calif. — Employing his folksy, inimitable style to deliver an oft-heard message, keynoter John P. Imlay Jr. called for a national policy on computers and communications to combat the "brain-intensive" Japanese.

The chairman of Management Science America, Inc. also declared that computer purchase decisions "must be based on business judgment rather than technical expertise," urging U.S. corporations to move such decisions to the board room.

Imlay's remarks kicked off the National Computer Conference last week where some 2,000 attendees responded to his dynamic, multimedia presentation with spontaneous laughter and a two-minute standing ovation. He called his selection as NCC keynoter a victory for the software and services vendors and a recognition of software as the driving force within the computer industry.

Using a combination of 100 slides, film segments (including a two-minute review of 300 years of computer history), a live satellite interview with a U.S. senator (Democrat Frank Lautenberg of N.J.), a live performance by a concert violinist, and his own biting wit, Imlay outlined a four-point plan for survival in the information age.

According to Imlay:

- Vendors, users and government each share a responsibility to the coming computer generation. "It is more important," he said, "that your son or daughter have a computer than an automobile." Imlay, who cautiously endorsed the controversial Apple Bill now pending in Washington, warned parents and educators of being intellectually outpaced by their computer-literate children and students.
- Corporations must recognize that "information technology is no longer a service but a weapon." Long-range computer' strategies should be hatched on the corporate board level by "information committees." Corporations failing to heed this planning strategy will wither and die, Imlay suggested.
- Vendors and users must lobby for the creation of a federal government agency to speak on information issues. There is no such agency now, in part because of "political leaders who gaze steadfastly back into the nineteenth century to make decisions." Such an agency would address the critical problem of retraining large segments of the working population to meet information-era needs.

Lastly, Imlay suggested, "If you do nothing else today, plan to go to some quiet spot, picture yourself in 1990, focus on that dream and begin to think of a long-range plan to achieve that dream."

In reviewing other aspects of the computer industry for his audience, Imlay predicted the demise of dedicated word processing equipment, which he said will be edged out by multifunction networked micros.

In addition, computer terminals will "soon become extinct" as they are replaced by personal computers featuring advanced software built by independent software companies. "The micro's role is that of personal computer, intelligent terminal and dedicated word processor. The term 'personal' or 'micro' will fade to what will be known as the workstation computer, whose value will be the software, and the mainframe power will become a commodity," Imlay said.

CW Photo by S. [illegible]

John P. Imlay Jr.

U.S. Supreme Court Rejects Last Appeal Of Computer II

WASHINGTON, D.C. — The U.S. Supreme Court last week rejected without comment a petition for review of the Federal Communications Commission's (FCC) Second Computer Inquiry Decision.

Filed by several states plus the National Association of Regulatory Utility Commissioners, the petition charged that the FCC had unlawfully preempted states' rights.

Litigation over the policy established by the Computer II decision is now over, an FCC attorney said, although there may be further court proceedings on implementation of the policy.

Mainframes Not Abundant on NCC Floor

NCR, Gould Highlight NCC Product Debuts

By Ed Scannell
CW Staff

CW At NCC

ANAHEIM, Calif. — A number of high-end mainframes from NCR Corp. and two mid-range scientific superminicomputers from Gould, Inc.'s SEL Computer Systems Division were the product highlights last week at the National Computer Conference — and the NCR entries were not even displayed on the show floor. Rather, the firm located the systems off-site and demonstrated them via terminals at its booth.

Basically, the four-day show, which in previous years had seen a plethora of large and medium-size system introductions, this year saw a dearth of mainframes on the floor.

NCR's V-8600 family has seven members and is being aimed at applications involving high-volome transaction applications. The systems are being targeted at IBM's 4341 Model 11 through 3083 Model J mainframes and feature an architecture that allows them to be grouped in loosely or tightly coupled configurations.

The base models of the new V-8600 machines are the V8635, which uses a single processor, and the V8645, which employs a tightly coupled dyadic processor. The tightly coupled systems, consisting of multiple processors running under a single operating system, were designed to maximize available power, according to the company. By comparison, loosely coupled systems use multiple operating systems and are designed to be more fault-tolerant for high availability.

Key features in the systems' design are the Dynamic Channel Director (DCD) and the Dynamic Channel Exchange (DCX). These two devices are intelligent electronic switches that control the availability and utilization of I/O devices.

An option for the V-8600 family is a second control processor in the System Control Unit (SCU). The SCU serves as the central control point of the V-8600 family by supervising operator communications, on-line diagnostics via local or remote consoles and automatic reentry with dynamic reconfiguration of the system if certain elements should fail, a spokesman explained.

The systems are field-upgradable from the entry-level V8635 to the high-end V8695. Systems in the V-8600 line run under NCR's VRX operating system. Programming languages available include Cobol, Basic, Fortran and Neat/VS.

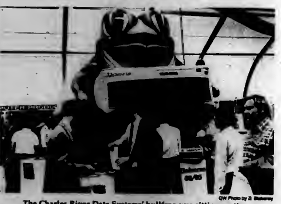
The cost of a 4M-byte V8635 holding 32K bytes of high-speed cache memory, two channel control processors with 16 I/O channels, dual-console CRT terminals and an SCU is $495,000. The dyadic V8645 with 128K bytes of cache memory goes for $795,000. Typical system configuration prices range from $60,000 to over $1 million for the V8635 and 8645 systems.

The loosely coupled configuration ranges in price from $995,000 for an 8M-byte V8655 to $2,995,000 for a V8695 with 16M bytes of memory. The systems will be shipped during this year's fourth quarter.

SEL's mid-range minicomputer is called the PS-5000 and is a repackaged version of the company's Concept 32 series but with virtual memory. The system stores up to 16M bytes of main memory and, fully configured, has a performance rating of 8 million instructions per second. The system can accommodate an additional 16 processors to handle "special applications" that work in parallel with the machine's main CPU.

Besides the PS-5000, the firm also introduced the PS-3000, a clustered processor that handles up to 128 users simultaneously, and the PS-1000, a desktop system that can hold up to 1M byte of data. All three systems are compatible with each other as well as with the company's Concept 32 systems and run under the Unix operating system.

A typical configuration of the PS-5000 is priced at $75,000, while an average PS-3000 configuration lists for $25,000. The PS-1000 with 1M byte of main storage, color or monochrome CRT, keyboard and Unix operating system costs $5,000.


CW Photo by [illegible]

The Charles River Data Systems' bullfrog was sitting pretty.

Amdahl Honored at NCC With Afips' Goode Award

ANAHEIM, Calif. — The American Federation of Information Processing Societies, Inc. (Afips) last week presented its prestigious Harry H. Goode Memorial Award to Dr. Gene M. Amdahl, who left IBM after a career in which he developed the 360 architecture and went on to found two mainframe companies, Amdahl Corp. and Trilogy Systems Corp.

The Goode award, given at the National Computer Conference, was established in 1964 to "honor and encourage outstanding contributions to the information processing field.

Amdahl received his B.S. in engineering physics from South Dakota State University in 1948 and earned his Ph.D. in theoretical physics from the University of Wisconsin in 1952. As a graduate student, he designed the Wisconsin Integrally Synchronized Computer, more familiarly known as Wisc. Amdahl's career has included the following milestones:

- From 1952 to 1955, Amdahl conducted simulation studies and machine design for character recognition, was the project engineer and chief designer for the IBM 704 and was the initial planner for the IBM 709 and 7030 (Stretch).
- In 1955, Amdahl took a leave of absence from IBM and the mainframe area for five years and became involved in developing the first of the CRT terminals and in the small computer area.
- He returned to IBM in 1960 and was named director of experimental machines and became the manager of architecture for the IBM 360 mainframes.
- In the fall of 1970, he left IBM to form Amdahl Corp., where he undertook the development of the 470V/6, the first mainframe to offer large-scale integrated circuitry and high-speed logic with an emitter-coupled logic 100-gate array. In 1979, he became Amdahl's chairman emeritus and a consultant to the company.
- Less than a year later, in August 1980, he retired from Amdahl Corp. to form Trilogy Systems Corp. with his son Carl. Trilogy is expected to introduce its first very large-scale, high-performance computer system sometime next year.

Also awarded at last week's NCC plenary session was Afips' first annual Education Award, presented to Dr. John G. Kemeny, professor of mathematics at Dartmouth College in Hanover, N.H. The former president of Dartmouth was selected for the Afips award because of his "visionary efforts at making computing universal for students of all disciplines."

Kemeny was co-developer of the Basic programming language and the Dartmouth Time-Sharing System.

A second award given by Afips at NCC was its Distinguished Service Award, presented this year to Dr. Richard I. Tanaka, president of Systonetics, Inc. in Fullerton, Calif. Tanaka was cited "In recognition of his many years of dedicated service to Afips and the international information processing community."

Tanaka's contributions to Afips date back almost 20 years, when he served as program chairman and general chairman of Afips' Fall Joint Computer Conferences in San Francisco and served on the Afips board of directors.

IBM Offers System/36-Compatible Peripherals

By Ed Scannell
CW Staff

ANAHEIM, Calif. — IBM embellished its System/36 announcement here with three compatible peripherals including a high-resolution nonimpact printer employing electroerosion technology.

Aimed at computer-based publishing systems, the 4250 printer reportedly creates camera-ready masters. The printer can be used with several other document processing and publishing system products made by IBM, as well as with the company's 30 series and 4300 processors running under the MVS/370, MVS/XA, VM/SP CMS and VSE operating systems, the company noted.

Because of its low decibel level, the 4250 can be used in office environments to produce masters for presentations, reports, brochures, engineering documents, manuals, charts and flow diagrams, an IBM spokesman said. Through a dry electro-erosion process, the nonimpact unit is able to generate masters with a print density of 600 by 600 pixels.

CW
At NCC

The unit's print head, which contains 32 tungsten-alloy electrodes embedded in a glass guide, is designed to glide over aluminized paper. When current flows through the electrodes, it erodes the aluminum coating of the paper and reportedly exposes a black undercoat.

The 4250 has a burst speed of 40 in./sec and can print out a typical page in between 1½ and 2½ minutes. It has 16 popular typefaces in 17 sizes, seven typewriter typefonts and a special set of characters.

The second System/36-compatible peripheral is the 5292 Model 2, a color graphics display that can be connected to the small business minicomputer either locally or remotely via the firm'a 5251 Model 2 or 12 display, according to the company.

The 5292 can also be attached to the System/34 and System/38, but with them it functions only as an alphanumeric display.

IBM also introduced a new version of its Model 8809 magnetic tape drive. The new version has a data transfer rate of 160,000 char./sec in streaming mode, the company said.

Price of the 4250 is $21,000 with three-, four- and five-year term leases available.

Big Blue Announces System/36

(Continued from Page 1)

IBM also announced an expanded availability of the IBM Credit Corp.'s financing program, including a new lease option for the System/36 and the extension of the term lease to a number of products.

The System/36'a processing "engine" is made of seven microprocessors, each with a dedicated function but with all seven working in parallel. For example, a control storage processor, operating in parallel with the main storage processor, provides microcode instructions for the system's I/O processors and interfaces.

Other architectural features of the System/36 include a two-byte data channel, the densest gate arrays ever used by IBM, and memory cards that offer up to eight times the storage of those in the System/34.

For use in a network, the System/36 reportedly offers up to four communications lines, which can be installed at the user'a location. The processor supports IBM'a Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or Binary Synchronous Communications protocols.

Besides software compatibility with the System/34, the System/36 is also compatible with the Personal Computer, terminals and other peripherals used by the System/34. The System/36 is capable of handling up to 94 local and remote terminals and printers simultaneously, the spokesman said.

Touted as the easiest mid-range system the firm has ever introduced, the System/36 features menus to guide the users through every operation and a complementing Help function that provides further assistance. The text and office management programs reportedly enable System/36 users to generate, edit, file and retrieve memos and letters, a spokesman explained. Users can also merge data and text and distribute documents to other users via SNA/SDLC.

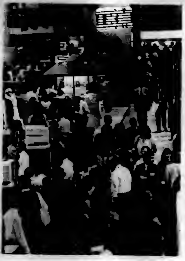
The basic version of the System/36 costs $34,000 and consists of 128K bytes of main memory, 30M char. of disk storage, two CRT displays, one printer and the operating system. The high-end configuration is priced at $176,000 and consists of 512K bytes of internal storage, 400M char. of disk storage, 26 displays, three printers, a tape drive, operating system and languages and utilities.

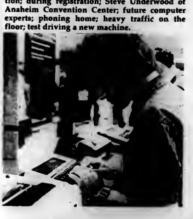
More information on the System/36 and the other products can be obtained from IBM field offices or directly from the firm's headquarters at 900 King St., Rye Brook, N.Y. 10573.

NCC Photo Essay

By Jim Bartimo and Susan Blakeney

From left to right: The Anaheim Convention Center; Commodore's monkey; before registration; during registration; Steve Underwood of Anaheim Convention Center; future computer experts; phoning home; heavy traffic on the floor; test driving a new machine.





Competition Intense

Raft of Portable Micros Displayed on Floor

By Ed Scannell
CW Staff

ANAHEIM, Calif. — Judging from the raft of portable microcomputers introduced at this year'a National Computer Conference, the competition among vendors to automate executives outside the office is becoming as intense as that trying to automate them in the office.

Jumping into the portable market for the first time was Anderson Jacobson, Inc., with two versions of a 20-lb unit intended for business applications. Dubbed the AJ Passport, the 16-bit system contains 256K bytes of memory, two disk drives atoring 320K bytes each and a 7-in. amber screen with an optional f2-in. external monitor.

Priced at $4,500, the first Passport features two diskette drives, a parallel printer port, serial communications port, time and date clock, 300 bit/sec modem, operating system and applications software. The second model, with single diskette drive, dual f/O ports and operating system, will be priced in the low $3,000 range.

Commodore Business Machines, Inc. also introduced its first portable: the Executive 64, a 27.6-ib system featuring 64K bytes of memory, a single, built-in 170K-byte disk drive and a 6-in. monitor priced at $995. A dual disk drive version costs $1,195.

Toshiba, Ltd. extended its T100 line of microcomputers with a portable system that also holds up to 64K bytes of memory. Housed in an executive briefcase, the aystem is equipped with a 40-char. by eight-line LCD, built-in Tbasic and Tdisk and has eight-color display capabilities.

Sharp Electronics Corp., another Japanese company, unveiled an Intei Corp. 8088-based portable system. The 1f-lb PC-5000 uses a bubble memory cartridge to store 128K bytes of information, expandable to 256K bytes. The device can also be supplemented with an optional thermal impact printer.

Several companies that unwrspped portable units also brought out complementing desktop machines, most notably Commodore and Toshiba.

Commodore'a BX 256-80 is a dual-processored system containing the company'a 6509 and Intel'a 8088 microprocessors. An optional Zilog, fnc. cartridge enables the aystem to run MS-DOS and Digital Research, fnc.'s CP/M, CP/M 86 and CP/M 2.2 operating systems.

The BX 256-80 contains 256K bytes of random-access memory (RAM) externally expandable to 960K bytes. While pricing on the system has not been set, a spokesman said the range will be between $1,695 and $2,495.

Toshiba'a first 16-bit desktop system is labeled the T300 Personal/Business Computer. Like the majority of systems both portable and desktop unveiled here, the T300 uses fntel'a 8088 chip and runs under MS-DOS-compatible programs.

Compatible with a number of IBM programs, the T300 holds up to 192K bytes of data and accommodates either one or two double-density 640K-byte disk drives. The unit'a f03-key keyboard features a cursor-control keypad, a separate numeric pad and a set of function keya. Options include an fntel 8087 chip for numeric processing, an fEEE-488 board and a multiaccess, high-speed RS-232 board.

CW
At NCC

A T300 with one disk drive and monochrome display costs $2,495, with a T300 two-drive system selling for $3,190.

In other microcomputer news, Fujitsu Microelectronics, Inc. took the wraps off the industry's first-available 256K-byte RAM chip. While the first implementation of the chip will be in the company's Micro 16 microcomputer, a Fujitsu apokesman said the chip is expected to have a dramatic impact on the company'a future mainframe products as well, in terms of cost, performance and reliability. The board will allow the Micro 16 to store up to 1M byte of internal memory and up to 40M bytes of hard disk storage.

CW Photo by S. [illegible]

Planning Ahead for NCC '84

NCC '83 — Mainframes, Minis Regain Limelight

(Continued from Page 1)

tion Center. However, as usual at NCC, significant software unveilings were few and far between.

This year's show lacked the hucksterism and gimmickry that has marked its predecessors. Instead, there were a lot of people trying to sort out the dizzying array of products in front of them. For instance, attendees could choose from such diverse products as The Rembrandt of Color Computers and ferro-resonant transformers or inspect the latest portable computers and microfloppy disk drives. For lovers of the orchestrations of P.T. Barnum, however, a 10-foot green frog was there to promote one vendor'a mini, and a pink dragon danced in the aun as showgoers relaxed on the grass outside the convention center.

The number of people in attendance was not available at press time, but a spokeswoman for the American Federation of fnformation Processing Societies, fnc. (Afips), which sponsored the show, estimated a final figure of over f00,000, based on Monday and Tuesday crowds.

For many at the show, NCC '83 proved to be literally the hottest show in years. To handle the hundreds of exhibitors at the show, Afips had erected six tent-like buildings adjacent to the main convention center. Cloth and metal creations, manufactured by Sprung Instant Structures, Ltd., turned into infernos for tenants and visitors alike as they baked in the afternoon heat. A few attendees reportedly collapsed from the heat within the tents, which is believed to have topped 100°F.

Afips attempted to put out the fire of protest by moving the air-conditioning ducts closer to the exhibition floor. There was even talk of the organizers ripping holes in the roofs of the structures to vent the oppressive heat. But this never came to pass.

Threats of class action suits and rumors of a mass walkout by the vendors also circulated.

An Afips spokesman said his organization regretted the Sprung Instant Structures situation and was trying to remedy it. However, "As you know, these are the hottest days of the year in Anaheim," he added.

Despite these problems, an overwhelming number of attendees interviewed on the show floor did express a preference for Anaheim over Houston, the site of last year's NCC. But they were less than enthused about the prospects of attending NCC in Las Vegas during July, the site and scheduled time of next year's convention.

Personal Computers: Tools or Window Dressing?

By Bob Johnson
Photos by Jim Bartimo
CW Staff

ANAHEIM, Calif. — The proliferation of personal computers into the mainframe environment has raised the question of whether they are being used to their potential or are merely high-tech decorations on users' desks.

Computerworld surveyed DP managers on the NCC floor to find out if personal computers are being used and, if so, how.

Ken Ascher, DP manager for a distribution and advertising company, said, "There are 10 IBM and [Apple Computer, Inc.] Apple IIe personal computers at our company now being used for market analysis, forecasting and applications and system programming. Previous to acquiring the personal computers, we were using a time-sharing system with an Amdahl Corp. CPU. The personal computers are being used extremely efficiently, especially in online order-entry applications."

Oscar Sandstrom, director of DP for Wisconsin DHI Cooperative, Inc., said, "Right now, we're using two personal computers in our shop, an IBM Personal Computer and an Apple IIe. The personal computers are being used the best way we can. We're using them to bring our staff into the 20th century. Our general ledger is still being done manually, so we are attempting to get those applications onto the personal computers. The users love them; once we get them on them, we can't seem to get them off."

John Hilliard, director of MIS at Stanford (Conn.) Hospital, said, "Some of our people are using personal computers. The funds department is now using two Commodore, Inc. personal computers, and they are dedicated to them. Although personal computers are being used minimally, our DP administration wants to go with them as long as they're integrated in a fashion which is compatible with our communications network. It's evident that they are being sufficiently used, so we absolutely want to see more of them."

Fanny Ho, systems manager at Computer Systems & Technology, Inc., said, "We are using Zenith Data Systems Corp. personal computers for spreadsheet applications and data base development tasks. They are not being used eight hours a day, but we're pretty happy with the amount of work gotten out of them."

Ben Wallace, MIS manager at Hybitech, Inc., said, "One of the ways one of our personal computers is being used is in a free-form mode. Scientists in our company can transcribe their notes and plot graphics charts whenever they can get onto the computer. In that sense, we don't know exactly when and how they're being used, but it is an interesting thing we've done to measure their use. Another personal computer is being used for financial planning, and it is virtually unsupported. And we have bought tutorial packages that have resulted in surprisingly good results."

Harry J. Luettchau, manager of systems at TRW, Inc., said, "The industrial engineering group has one, but it's only being used as a toy. This is only because this group bought it without a company plan behind it. TRW is now planning for personal computer integration, but it will be in conjunction with the company's local-area network."

Harry Luettchau

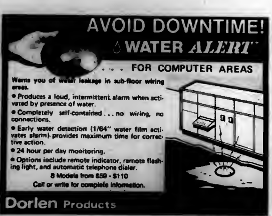
John Hilliard

Ken Ascher

Oscar Sandstrom

Fanny Ho

Ben Wallace



Communications Products Unveiled

Network Offerings Abound on NCC Floor

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — Micom Systems, Inc. used last week's National Computer Conference as a forum to introduce a raft of data communications products including Instanet, a local networking architecture that supports local or remote computers, terminals or personal computers.

Instanet is based on Micom'a Micro600 private automatic branch exchanges. Instanet consists of four modules. The first is Instatrunk480i, which provides direct access for up to 128 channels and operates at T1 speeds of 1.544M bit/sec and costs $3,200. It will be available in September. Instamux470i is used for direct connection of local multiplexers supporting up to eight terminals on in-house telephone wiring normally used for one terminal. The four-channel version costs $650, while the eight-channel unit costs $850.

Micro800/2i provides direct connection of remote clusters of up to 16 terminals. The eight-channel version costs $2,500, and the 16-channel version, $4,200. The Micro400 Models 430 and 431 are pocket-size line drivers for single-terminal or personal computer connection to the network. The two cost $85 and $95, respectively. Micom is located at 20151 Nordhoff St., Chatsworth, Calif. 91311.

Timeplex, Inc. introduced a network management system that controls and monitors 424 EIA ports from a single terminal. The Sentinel 424 monitors the ports in a scanning cycle, looking for changes on up to four active alarm pins per port. Multiplexers, modems and other devices with supervisory ports or similar interfaces can trigger an alarm. Timeplex is located at 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

CW At NCC

Corvus Systems, Inc. also released several new offerings — most notably, the Corvus Systems Network Architecture (SNA) Gateway, a device that links IBM SNA networks to Corvus Omninet local-area networks. The gateway enables IBM Personal Computers and Corvus Concept microcomputer users on Omninet to communicate with IBM mainframes in program-to-program mode, function as interactive remote terminals for the mainframes and deal with the host computers in batch mode. Corvus SNA Gateway will be available in early 1984 and costs $7,500.

Other Corvus products introduced included an Omninet interface for the Digital Equipment Corp. Rainbow personal computer, costing $495 and available in August, and an Omninet interface for Zenith Data Systems Corp.'s Z100 desktop computer. It costs $495 and will be available in August. The Corvus Mirror disk backup system will allow IBM XT personal computer users to copy data from Winchester disk drives to video tape cassettes for archival storage. That capability will be available in August. It costs $495.

The last three Corvus products are the Bank, a microcomputer memory unit that features removable mass memory, and Corvus Graph and Corvus paint graphics software packages. The Bank holds up to 200M bytes of data, costs $2,195 and will be available in September. Corvus Graph costs $395 and Corvus Paint, $695. More information is available from Corvus at 2029 O'Toole Ave., San Jose, Calif. 95131.

Televideo Systems, Inc. introduced a portable computer that offers network capabilities and Digital Research, Inc.'s CP/M operating system. Teletote has an optional RS-422 network port that enables it to be linked with a Televideo network for access to shared files, printers and electronic mail. The 9-lb portable computer has a 9-in. video display screen and costs $1,499. It will be available in September from Televideo at 1170 Morse Ave., Sunnyvale, Calif. 94086.

Lear Siegler, Inc. took the wraps off its ADM 11 and ADM 24E CRT terminals. The ADM 11 dumb CRT terminal offers a detached keyboard, four function keys and a 25th status line. Available in June, it costs $695. The ADM 24E smart CRT terminal provides a standard 48-line display memory and 16 programmable function keys, which can be shifted to perform 32 functions. It costs $1,250 from Lear Siegler at 714 N. Brookhurst St., Anaheim, Calif. 92803.

CW Photo by S. [illegible]

Keeping Cool and Relaxed at NCC

Assists Small and Medium Applications

Relational DBMS Seen Key to Future of DP

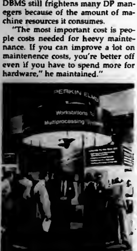
By Paul Gillin
CW Staff

CW At NCC

ANAHEIM, Calif. — The information center of the future will revolve around a central relational data base management system (DBMS) with assorted fourth-generation languages and microcomputers. But, although still in its infancy, relational DBMS technology can be very useful to DP today, according to data base consultant Willem Stoeller of Arthur Andersen & Co.

Speaking last week at the National Computer Conference, Stoeller stated that "relational technology can be used already to improve the productivity both of the DP department and the end user." However, relational DBMS still frightens many DP managers because of the amount of machine resources it consumes.

"The most important cost is people costs needed for heavy maintenance. If you can improve a lot on maintenance costs, you're better off even if you have to spend more for hardware," he maintained."



CW Photo by S. Blakeney

Perkin-Elmer's exhibit drew its share of shoppers.

Stoeller said relational DBMS are efficient for most small and medium applications that do not require heavy transaction processing, and that they provide important programmer productivity benefits over the efficient but more complex traditional methods.

In the analysis and design stage, relational DBMS offer prototyping capabilities and report generation, which provides, "a better idea of user needs, leading to better quality of applications and simple programming specifications for the next stage of development." He said prototyping is too expensive to run in a Cobol or IBM IMS environment.

Programming is enhanced by the user-friendly interface inherent in relational technology, he said. This not only allows applications to be created by users, but programmers benefit from a data structure that is set rather than record oriented. The syntax is also very simple to use, he said, with only four basic commands needed for data manipulation.

Data base administration is eased by relational technology because of the availability of built-in system catalogs that eliminate the need for an additional data dictionary, Stoeler noted. independence of data also makes maintenance easier.

"Physical changes to that data base have no impact on existing applications," he said. "Changes in structure of the data base can be transparent for applications not dealing specifically with the functions being charged."

Unlike traditional DBMS technologies, which incorporate extensive parameters, relational systems have very few, he said. This simplifies both the learning process and data administration. Relational technology also incorporates a built-in optimizer that selects the most efficient access method, eliminating another programming step. End users can easily learn data manipulation languages and should stay away from data definition commands.

Stoeller noted that relational DBMS technology is still evolving and notably lacks the performance capabilities for processing large applications like airline systems or data entry. Improvements in the user interface are still needed, he said. Standards have not been adequately formulated, although the Ansi X3H2 committee is studying that issue now. Data integrity features also need to be enhanced to provide better validation in fields between tables, the consultant said.

Relational DBMS technology is moving quickly, with microcomputer versions expected to be introduced this year, he said. Resistance to the tool will melt as "there is more of a push from end users for easier access to the information center." DP managers "only recently have realized they can use relational technology with their current hardware and still get good performance," he said.

Printronix, Nicolet Zeta, Facit Printers Bow

By Tom Henkel
CW Staff

ANAHEIM, Calif. — Amid a scanty lineup of new peripherals, several vendors announced new printers here at the National Computer Conference.

Printronix, Inc. announced the 4160 printer/plotter, the MVP desktop line printer and the P-600XQ, a floor-model matrix printer.

The 4160 was designed for engineering and scientific graphics printouts. It is said to feature a plot rate of 2,300 dot/row per minute and a maximum plot width of 13½ in. The unit can complete an 8½- by 11-in. drawing in about 40 seconds and a 11- by 17-in. drawing in about 75 seconds. The 4160 costs $5,380.

Offering 80, 150 and 200 line/min print speeds, the MVP can also provide plot rates of 8.3 to 27.8 in./min. The printer was designed for stand-alone hard disk-based microcomputers and costs $3,475, the vendor said.

The P-600XQ can print a standard 8½- by 11-in. form, or up to 198 characters on a standard data processing form, at 15 char./in. The floor unit was designed for data processing or heavy-duty office environments and costs $7,795. Printronix is located at 17500 Cartwright Road, P.O. Box 19559, Irvine, Calif. 92713.

Nicolet Zeta Corp. announced a high-resolution quality pen plotter which can connect directly to an IBM 3274 or 3276 cluster controller. Called the Zeta 887, the unit can operate in an IBM Systems Network Architecture/Synchronous Data Link Control environment. The 887 has a plot speed of 20 in./sec. It costs $7,950 from Nicolet Zeta at 2300 Stanwell Drive, P.O. Box 4003, Concord, Calif. 94524.

Facit, Inc. announced the Facit 4528 near letter-quality intelligent printer. It is a multipass unit which can print normal text, variable size matrix characters, pin graphics and nine-bar codes at 165 char./sec. It is priced at $1,595 from Facit, 235 Dunstable Road, Nashua, N.H. 03061.

Inman on Role at MCC, National Security

Bobby R. Inman's appointment in January as president and chief executive officer of the Microelectronics and Computer Technology Corp. (MCC) was greeted by praise in some quarters and by strong criticism in others. The 51-year-old retired U.S. Navy admiral brought no private-sector managerial experience to the job, even though he heads a private-sector endeavor comprised of 14 computer and semiconductor companies that was formed to compete head-on with advanced Japanese research.

Inman's appointment as MCC chief came after he had stepped down as deputy director of the Central Intelligence Agency last summer. Additionally, he had served as director of the National Security Agency, the Defense Department's primary intelligence wing.

Inman gained national attention last year when, in testimony before a congressional committee, he suggested that certain published data on advanced electronics research might be subject to government review to stem the flow of strategically sensitive research data. Inman claimed the press blew his review suggestion out of proportion, but he stuck to another claim that the Soviets had launched a massive effort to obtain strategic technological information from the West by whatever means necessary.

Those who have praised his appointment as MCC chief say he will help MCC follow its charter to "try to maintain U.S. preeminence and predominance in the microelectronics and computer field." Inman admits MCC has ground to gain on the Japanese and their well-funded fifth-generation and artificial intelligence research projects, which are being conducted by the Ministry of International Trade and Industry (Miti) and the Institute for New Generation Computer Technology (Icot). In an interview by Computerworld *Senior Editor Bill Laberis last month, Inman explored MCC's national importance and its chances of success.*

Wide World Photo

It was said that you were chosen to lead the MCC because you understand the role that advanced electronics plays on the national and international scene. What is your role in MCC and what are the national security implications for the U.S.?

I believe the next 15 years are going to be a time of intense economic competition. Much of that competition will be with our allies and friends.

Keeping that competition manageable so that we hold key alliances together is going to be particularly critical. When one looks at the Soviets in that same time frame, they're going to have more mobile military power than they've ever had. They will not be able to compete economically. Therefore, if we fall into great disarray in our alliances, we will substantially increase the risk that the Soviets would turn and use military power.

Clearly, barriers to trade would accelerate that certainty; that's been the historical record. So what this led me to conclude a long time ago and feel increasingly today is that the best prospect for managing that economic competition is to lead it, to stay at the leading edge through investment in research and development across all the industries.

It just happens that the high-tech ones — computers and microelectronics — were ready to be done. If the Japanese had not organized under Miti and had the success they did, I'm not sure U.S industry would have gotten together.

Second, for surveillance, for indications and warning, for command and control, for the redundancy that gives you the time to make military decisions, the advanced state of the art in communications and electronics is critical to the country's security. And whatever one can ultimately do that offers the prospect that you can assimilate, sort through and make sense of huge arrays of information offers the prospect of helping us manage through the difficulties that I expect.

What is your view on government scrutiny or censorship of published data of advanced work on microelectronics?

The view I've espoused all along remains unchanged: It is simply not feasible to try to restrict the flow of information published on basic research. You run a greater risk of damaging your own creative transfer than you gain by blocking the flow to other countries.

Where advanced research and development is concerned, you clearly have to look at whether it's the national security or proprietary data you're trying to protect. I think U.S. computer companies are going to be increasingly concerned abont protection of proprietary data. Certainly, MCC's bylaws focus on that substantially.

The government will continue to have concerns about the transfer of that [data] which has military applicability. Normally it encourages that transfer to Western alliance countries. That may from time to time produce some conflict with the private sector if [private companies] see that as a way by which they lose their proprietary edge.

You have to keep in clear focus that what you're talking about is time advantage . . . to get to the marketplace first. With MCC, the bylaws as they're established prescribe that companies that fund research get three years advanced lead in using it.

Will the Japanese with their Miti or Icot fifth-generation and artificial intelligence projects adopt a similar practice of sharing research data only after they have given their own companies a lead?

That's exactly what I expect to see occur.

The Japanese government is overtly involved with Miti and Icot. What role, direct or otherwise, will the U.S. government play in MCC, and if there is a role, what should be the government's return on investment?

First, when you look at the era of great economic growth in the U.S. in the late '40s and '50s I believe you will find the impetus was in a very large measure [U.S. Defense Department] funding of basic research and grants to graduate education, without strings attached, that played a very major role not only in finding things that were useful in defense, but in stimulating tremendous commercial growth.

Much of that was cut back in the '60s. It wasn't cost-effective as one looked for ways to pay for the cost of Vietnam. Nobody else moved to fill

(Continued on Page 16)

Inman Talks About MCC, National Security

(Continued from Page 15)

the gap.

Defense today remains the only single part of the government that has both the size and the scope to impact across a very broad range of research in the country. So, I have watched with interest Defense's effort to refocus on the whole area of computers and software.

I applaud all that. Ideally, I'd love to see Defense spend money to increase the number of academic centers of excellence in the country as an early part of their effort. Later, when we're fully established, I don't rule out that we could be a place where Defense might want to accelerate or broaden some research that we're doing. But I do not see government funding as a way of lessening the commitment of these private companies. This is a private-sector initiative.

How great a threat to our national security are the Japanese and their work on advanced electronics, especially as the lines between commercial and defense applications in computer science become more blurred?

You never want to be totally dependent on the Japanese or anyone else for anything. The fact that we will use some of their parts does not bother me at all, if they're the best available. But, it is simply not wise to depend totally on any critical component, given the danger that the source may be cut off for any reason. You can accept some degree of dependence. But it would be a grave mistake to become dependent to any great degree on the Japanese or any foreign supplier for the chips that drive high-speed computers, for example.

It has been said that no effective response to the Japanese advanced microelectronics research projects has been made to date. Agree?

There is plenty of skepticism as to the pace at which MCC can get under way. Until we actually begin doing the research by the end of the year, the best we have is a promise, not a response. It is fair criticism, but it also has put a lot of pressure on us to get it going.

What are you doing to meet that challenge?

The most critical factor in what we're doing now is the assemblage of talent. I have gotten a flood of resumes. Based on the areas we considered locating our headquarters, I had assembled a dats base of the top personnel in those areas, with the ones working for the member companies being very high priorities.

I've been getting a lot of help, too, from the member companies. I'm also using MCC's board of directors — one from each of the member companies — and its technical advisory board, which has one senior technical representative from each company.

What are the greatest strengths and most significant weaknesses you bring to the job at MCC?

My greatest weakness is a lack of marketing experience. I have put together major projects in Defense, sold them to Congress and proceeded to execute them. But I never really worked at the marketplace to turn a profit. One of the attractive things about MCC is that marketing experience is not a requirement.

But I've managed complex organizations where you have diverse and competing interests of people who feel they have to work together but aren't always happy about it. Trying to create a climate where scientists are happy and productive and can deliver on time is something I've had a fair amount of experience in.

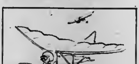
Wirth to Keynote Telco Users Meet

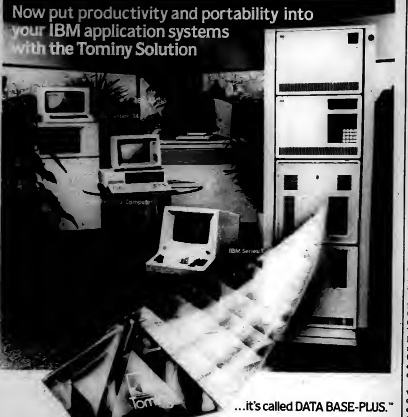
NASHVILLE, Tenn. — Rep. Timothy Wirth (D-Colo.) will be the keynote speaker at Telco Research Corp.'s second annual 1983 Users Forum, which will be held June 23-24 at the Hermitage Hotel here.

Wirth will speak on the "Cost Impact of Congressional Legislation on the Corporate Customer: Deregulation, Divestiture, Local Access and Transport Areas," according to Telco President James Jewett. Wirth "has made his major area of work and interest in the House the exploding industry of telecommunications," Jewett said.

The sessions at this year's forum will be geared toward telecommunications professionals and high-level executives using Telco's services, the company said. The cost for attending the two-day conference is $125 for Telco users and $250 for others.

Further details about the forum are available from Telco, 1818 Division St., Nashville, Tenn. 37203.

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Leads to Less Job Satisfaction

Micro Tech Seen Reducing Motivation of DPer

By Robert Batt
CW West Coast Bureau

ANAHEIM, Calif. — The growth of microcomputer technology and information centers in large corporations is leading to less job satisfaction and lower motivation for DP professionals.

This assertion was made by Daniel Couger, professor of computer and management science at the University of Colorado, on the opening day of the National Computer Conference here.

In an interview before delivering the paper "Motivation of the Maintenance Programmer" to a technical session at the show, Couger said the emphasis on more user-friendly computing, through productivity tools such as application generators, is reducing the job skills of the typical DPer.

"End users are being given the interesting jobs in the area of decision support systems while the routine maintenance of transaction processing is still left with the programmer," according to Couger.

In addition, Couger claimed, the growth of the information center means that when users get in trouble because of, for example, lack of proper documentation, programmers will have to sort out the trouble, thereby adding to their maintenance load.

"All of this will lower the motivation of the DP professional," he argued.

Maintaining Systems

Turning to the theme of his paper, Couger claimed that research he has undertaken at the University of Colorado, together with Melvin Colter, assistant professor of management science, shows that at least 50% of the typical organization's labor budget is spent on maintaining existing systems.

"The potential for improvement in this area is substantial," he suggested. "This research project shows that as much as 40% improvement in productivity can be accomplished," he claimed.

The project used information from a University of Colorado data base containing data from 300 companies and 6,000 DP professionals. It asserted the motivating potential of maintenance work is less than two-thirds that of new development work and even lower for fix-it-type maintenance.

Restructuring Work

In his talk, Couger suggested restructuring maintenance work so that there is more of a balance between the demands of the job and the skills required. One way to do this is to give maintenance work to people with lower work skills, for whom traditional maintenance work would be challenging, Couger said.

He also recommended changing the nature of the work itself by either giving programmers total responsibility for a maintenance project from beginning to end or involving them in more contact with the end user.

CW
At NCC

This, of course, would require more training, particularly in the area of communication and managing projects, he conceded.

"The whole point is the match between the job and the skills required," Couger stressed.

While DP professionals exhibit the highest need for personal growth in their jobs of any industry, traditional maintenance, which makes up the bulk of their work, is perceived as unchallenging, he noted.

Some individuals enjoy the challenge of maintenance troubleshooting, which is problem solving under critical schedule application conditions. Others, however, prefer not to work under such conditions, he explained.

DP Less Sexist Than Other Fields, Women Say

By **Bill Laberis**
CW Staff

CW
At NCC

ANAHEIM, Calif. — Is there greater or less sexual discrimination in computer-related businesses than in other fields?

A random sampling of 10 women professionals last week at the National Computer Conference indicated unanimously that sexual barriers are either far fewer in the computer field than in other industries or nonexistent.

Moreover, there was general agreement that computer marketing and sales positions hold perhaps greater opportunity for women than men, partly because women in sales are less intimidating.

"This is one field where it's a person's technical expertise that really counts," said Doris Berke, assistant director of product development at Smith Corona Co. in New Canaan, Conn.

Berke speculated that the managers in the more established or traditional industries, such as banking or finance, had little exposure to women as peers while in professional schools and the business world. Thus, women have been seen as an unknown and unproven quantity in these fields and have been treated accordingly.

In computer-related businesses, however, the predominantly younger male managers competed against women as peers in business school and fought them for entry-level positions in industry, she said. "They've had a chance to see what women can do professionally and don't have a lot of the usual hang-ups."

Asked if she felt she is paid the same as men in similar roles at Smith Corona, Berke replied, "I sure better be."

Joanne Markun, a product manager also at Smith Corona, agreed that there are more opportunities for women in computer-related businesses than elsewhere.

But unlike Berke, Markun said she had experienced sexual discrimination at a previous job, claiming it impeded her ability to gain promotions and responsibility.

"The management there expected women to remain on the outside," she said, declining to name the company.

'Better Fields'

Michele Kuhar, an independent marketing consultant whose most recent client was Management Science America, Inc., said computing is "definitely one of the better fields for women.

"The people running the companies want the best person — it's as simple as that," she said. "They ask, 'What can you do for our company?' . . . It's one field where women can do better than men in some areas."

Kuhar, who said she has noticed an increasing percentage of women consultants, said many former secretaries are leaving their desks and seeking training for word processing and office automation equipment. These women, she said, have a more intimate understanding of the needs of office workers and, therefore, can "do very well for themselves" in sales positions.

Jerilyn Williams, office manager at Wintek Corp. in Lafayette, Ind., said the number of women attendees at computer shows like NCC is a good indication of opportunities open to qualified people regardless of their gender.

However, Williams said she is "probably not paid as well as men in the same position," adding that sexual discrimination barriers are "going to be difficult to overcome."

And Charlotte Goldsberry, director of marketing and instruction at National Computer Corp. in Reno, Nev., said the computer field "holds all kinds of opportunities for women, mainly because there is such a need for good people."

Just one year out of college, Goldsberry said she ignored her college training in human services to pursue "a field where I knew I could earn some money both as a professional and a woman."

Directory Lists Top DP Execs

PHOENIX — Applied Computer Research, Inc. has announced the spring version of its semiannual "Directory of Top Computer Executives."

The edition is said to contain more than 8,700 top names in industry and government in the U.S. The directory is organized geographically with an industry cross-reference.

Each entry contains the company name and address, subsidiary and/or division names, type of industry, phone numbers, computer systems installed and the names and titles of the top data processing executives.

Basic selection criteria are gross annual sales of $50 million and/or annual DP budgets of more than $250,000. The directory costs $125 per copy or $200 for an annual subscription through P.O. Box 9280, Phoenix, Ariz. 85068.

Growth, Change Seen Key

DP Seen Offering Women Abundant Benefits

By Lois Paul
CW Staff

CW
At AWC

ANAHEIM, Calif. — Being able to grow and change are two of the most important benefits offered in the data processing industry.

With this advice, Margaret Loftus, vice-president of software development at Cray Research, Inc., kicked off the second annual conference of the Association of Women in Computing (AWC).

The conference, which drew 130 people, a significant increase over last year's attendance, was held here the day before the official opening of the National Computer Conference. The AWC theme was "Women Emerging With the Information Age."

Loftus told attendees that opportunities are abundant in data processing, and that being a woman is not a significant obstacle to taking advantage of them. She cited the fact that 26% of the people in the computing field are women. Between 1970 and 1980 there was a 44% increase in the number of women in computing. Loftus noted that 20% of the project managers in the DP industry and 15% of the overall managers in the field are women.

Discrimination Not a Problem

"I don't think discrimination is really a problem, particularly in software," she said, adding, "I really think a lack of skills is the only real roadblock.

"Quality of work is a primary yardstick by which we are judged. Promotions go to people who do the best work," she commented.

It is Loftus' feeling that too often technical skills are viewed as being all-important and that women overlook the personal skills that are required in management. "A leader for the '80s is a person of action who is not afraid to take risks, a person who cares about and can communicate with people," she said.

Loftus started her career in 1976 at Cray overseeing a software group composed of six programmers. She currently manages 180 people, her primary job being to "set visions and align players." Communication is the key to accomplishing these tasks, she learned, and Cray and Loftus have worked to set up creative forums for this feedback.

Communication Methods

One of Loftus' communication methods is to take 12 people out for a working lunch about once every three weeks. Essentially, the group covers her agenda and then is given the opportunity to bring up its own concerns and ideas over a 2½-hour period. She also conducts quarterly reviews of her employees in order to check that they are "aligned" with the goals and functions of her division.

For its part, Cray has a seminar called "The Cray Profile: Past and Present and Future." The seminar enables employees to learn more about the company as well as to discuss future directions.

The firm also published a style statement that contains statements such as "We take what we do very seriously, but we do not take ourselves very seriously." Loftus said she spends a lot of time talking about the company's style statement. "My job is to communicate those types of things within my division," she asserted.

Loftus added that she works continually at trying to improve a number of skills in her employees. These include:

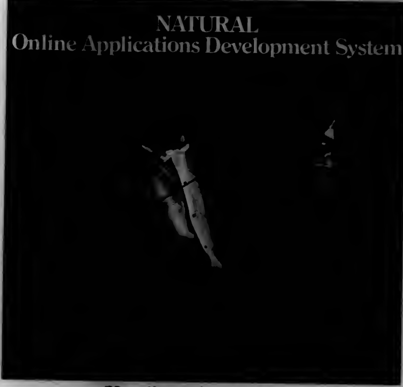
- Honesty and openness — "You have to deal in an environment which seeks feedback."
- Being a participator and not a spectator — "Never be a complainer because complainers finish last."
- Working hard but making sure what you are doing is fun — "If it isn't fun, go do something else."
- Breaking big tasks down into pieces so you can have a sense of accomplishment as each is completed.

Be Prepared

She also advocates that employees should be prepared, should be good communicators and should be willing to take a few risks along the way.

CW Photo by L. Paul

Margaret Loftus



Panel Considers DP Rich With Career Options

By Patricia Keefe
CW Staff

CW
At AWC

ANAHEIM, Calif. — Computer professionals are poised on the threshold of a new computing era that promises to provide them with a wealth of career opportunities, according to Sarah Edwards, president of Home Enterprises Unlimited. If they possess the right skills, these computer professionals will find themselves "in the right place at the right time."

Edwards, a specialist on the world of electronic cottages, delivered that message to an audience here at the Association for Women in Computing's second annual conference held prior to the opening of the National Computer Conference. She is currently writing a guide to working at home, which focuses on the use of computers outside the traditional work place.

In keeping with the conference theme of "Women Emerging With the Information Age," Edwards addressed her remarks to the role that computers can play in expanding and changing conventional definitions of career and work habits.

Up until very recently, people tended to work set hours at a particular job for one or two companies until they retired, Edwards said.

But computers are changing all that now by providing workers with options encompassing when, where and for whom they will work. However, "the real option of today — what we'll be doing — hasn't even been thought of yet," she added.

Imagination Needed

"We are standing on the ground floor of a new era. All you need is the imagination and creativity to step into" a better, or "mutated," career, Edwards said.

She added that there are at least 135 businesses that could be started by a person who has a personal computer.

Edwards predicted that as a result of career mutations nurtured by the flexibility afforded the working populace by computers, the business world in the year 1990 will be very different from the business world of 1983.

Attendees at the session, called "Career Mutations: New Options for the Computer Professional," heard three panelists, in addition to Edwards, discuss the evolving career options extended to them by computers.

Panelists included Barbara Elman, publisher of "Word Processing News" and public relations director for Rising Star Industries; Jane Minogue, technical writer at Compucorp; and Dale Marlin, systems support manager for IBM's western regional office.

Better Careers

Session panelists related how their exposure to the capabilities of microcomputers changed their careers for the better.

"When you talk about computers, you are really talking about people and how they can do their jobs better," Elman said. She related that her "head was turned around 360 degrees" after her first exposure to computers five years ago, when her employer asked her to take a computer course and regurgitate it to him.

After purchasing her own computer, Elman opened a typing service in her home and soon found herself spending an increasing amount of time counseling other writers on how to purchase and use a computer. In some cases, Elman could be found giving advice to Hollywood studios.

Realizing that her computer counseling could only lead to a dwindling clientele, Elman saw a market with a need and began publishing a newsletter for "wordsmiths who work with computers and computerists who work with words."

Parlayed Exposure

Elman has parlayed the exposure gained from her newsletter into free-lance writing assignments for other publications and has coproduced with Edwards an instructional videotape. She has also recently been named publicity director for Rising Star Industries, a telecommuter company with employees spread across the U.S. Most Rising Star Industries employees work primarily from their homes.

Panelist Minogue was able to use technology to help her have the best of both worlds — a place in the work force and time at home during and after her pregnancy. She estimated she saves at least four hours a day by working at home as a "telecommuter."

However, there are disadvantages to at-home working, according to Minogue. She pointed out that telecommuters need a trusting employer, one who will not question whether they are actually working when at home.

Also, working at home removes the telecommuter from the world of office politics. "You become less visible, lose status and can miss out on promotions and projects," Minogue warned.

Done Ahead of Time

Groundwork Seen Key to Quality Software

By Lois Paul
CW Staff

CW
At AWC

ANAHEIM, Calif. — Doing the necessary groundwork ahead of time to assure quality and reliability in software products was the theme of two presentations on software engineering at the Association for Women in Computing's second annual conference, which took place here a day before the doors opened on the National Computer Conference.

Chris Strutt, consulting engineer for Digital Equipment Corp. in Westford, Mass., discussed "Software Management in the Commercial Sector." Dr. Deborah Downs, project engineer for Aerospace Corp. in El Segundo, Calif., spoke on "Integrated Software Engineering Management."

Strutt said her group at Digital has spent five years working on methods to "minimize the gap between customer needs, requirements and expectations and their perceptions of delivered systems." To accomplish this, the group has developed software quality dimensions, a set of 13 facets of the engineering process that can be used to quantify software quality. These dimensions include: software capabilities, publications (documentation and user guides), packaging, installability, ease of use, performance, reliability, maintainability, maintenance, compatibility, evolvability, cost and timeliness.

Phase Review Process

Her group also employs a phase review process whereby they break down the work of delivering quality software into the following five phases:

- What is the problem?
- What is the solution?
- Build it and test it.
- Double-check it.
- Sell and support it.

In discussing integrated software engineering, Downs of Aerospace Corp. listed increased reliability, lower software costs through use of reusable code, availability of a history of system development and a carryover of the learning curve as benefits. The environment she discussed involved very large systems that include data base support as an essential component.

The requirements language should be close to a structured natural language to facilitate obtaining specifications from users, she explained. Specifications, which are created by the systems analysts, should be written in a machine-processable programming design language that is supported by a structured editor. The specifications should be mapped to a data dictionary. During the design phase, partitioning will be handled by an artificial intelligence-based design methodology assistant that can help determine how much reusable code the system is able to take advantage of and will add this information to its heuristic knowledge. Rapid prototyping at this phase will include some of the actual functions of the system, she said. A building block library will provide reusable code for the bottom level of system modules. These will consist largely of one-function modules or data abstractions that can be plugged directly into the system.

To reduce the number of support tools required during the programming stage, Downs said, the higher order language that is used should be compiled to an intermediate language. Code generators will be needed for multiple machines during this stage, she said. Integration will be controlled by the design tree, while the functional test units will be used and errors will be returned to the user in the editing environment.

Speaker Dispels Myths Clouding DP Consultants

By Bob Johnson
CW New York Bureau

CW At NCC

ANAHEIM, Calif. — "There is a lot about computer consulting that people don't know. For example, one thing not often realized is that there are different levels of maturity between a contract programmer and a management consultant."

That is what William M. Rieken, an independent consultant and lecturer said here last week at the National Computer Conference at a Professional Development Seminar focusing on the "Myths of the Computer Consultant."

The speaker maintained that although there are some crossovers in the jobs of contract programming and actual consulting, there are also definite distinctions.

"The primary consideration in the field of independent consulting is who you are serving. The management consultant must remember that he is serving the entire organization, not just the DP manager who is doing the hiring. If you take a job in a specific section of IBM, for example, you are not working only for that section, but for IBM as a whole," he said.

The contract programmer, Rieken said, is usually hired for actual hands-on programming responsibilities and remains at a client's site for an extended period of time. But the consultant stays on at a client only as long as it takes to analyze and offer a solution to a problem, he added.

Contract programmers have no say in what a project will be or what the deadlines are, Rieken said. "The consultant will be hired to find out costs and procedures and then report recommendations on how implementation should be initiated."

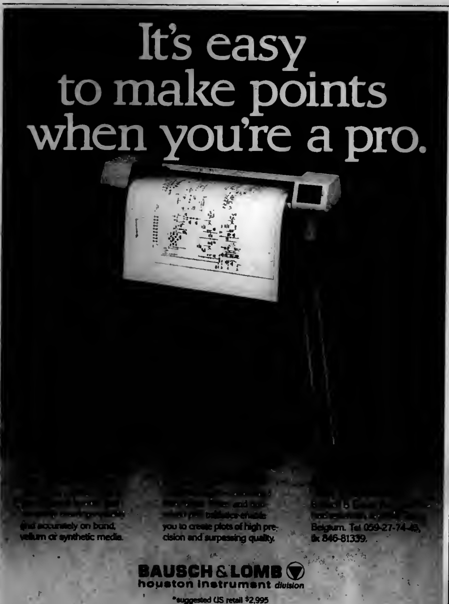
An assignment that Rieken worked on was offered as an example to illustrate the difference between contract programming and consulting. He said that a company that had separate programming and central DP operations needed an analysis for the integration of personal computers and distributed data processing.

"The programmer was hired to get his hands dirty and do the actual programming work. I didn't handle any of that. My expertise involved advising management on making the final decision. This is the area that the true consultant is involved with. I do sometimes get my hands dirty and do some programming, but by and large, I do it just to keep in practice."

Area of Confusion

Another area of confusion in the consulting field is why they are actually needed, according to Rieken. He mentioned points such as applications backlogs and the need for technical expertise as obvious reasons for seeking a consultant. The less obvious reasons include the need for DPers to keep up with technology, company budget cuts and hiring freezes, late projects, company political or personality problems, the leaving of a key DPer within a company, special one-time projects and a fresh approach to a DP problem.

"There are many good reasons for hiring a consultant, but the bottom line is cost-effectiveness," the speaker stated. "A good consultant may cost up to $60 an hour or better, but the savings may turn out to be more beneficial over the long run."



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[1] *Datapro:* "User Ratings of Proprietary Software-COMPLETE" November 1982. [2] *Computerworld:* December 20, 1982.

CW Photo by S. Blakeney

Surrounded by a sea of unpacked boxes and crates, a workman puts finishing touches on a display prior to the opening of NCC.

Exec Lists Ways To Organize Managerial Time

By Katherine Hafner
CW Staff

ANAHEIM, Calif. — DP managers in need of help at organizing their time were presented with guidelines to improve these skills at a Professional Development Seminar during the National Computer Conference here last week.

The suggestions came from Ron Episcopo, vice-president of learning services at Software Design Associates, Inc. in New York. He told attendees questions they must ask themselves before they can master time management:

- What do we mean by time?
- What does one do to control it?
- How does one control masses of paper?
- How does one control telephones?
- How does one curb the number of uninvited visitors and socializers coming into the office?
- How does one control the plethora of meetings one must attend?

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Episcopo put his audience to work immediately on filling in a work sheet designed to identify their most pressing problems. He then asked them to remove their wristwatches as he conducted quizzes to determine their "time consciousness."

According to Episcopo, three elements attempt to control the DP manager's time: the boss, the system and the manager himself.

His formula for conquering these three demands includes one important concession: Responsibility for projects can always be passed down from superiors and will seldom be rejected. If responsibility is passed up from subordinates, it should probably be passed right back.

He also had the audience identify specific pieces of paper that waste time and worked with them to develop guidelines for more efficient use of the telephone and for delegating tasks to their subordinates.

Would Trim It by 10%

ACM Proposal to Cut Chapters' Budget Opposed

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — A proposal by the Association for Computing Machinery (ACM) to trim its chapters board budget by 10% has drawn sharp protest from some of the ACM members who would be hardest hit by the cuts.

By a wide margin, about 50 people attending an ACM chapters forum meeting here last week urged the association's Executive Committee to reject the suggested spending reductions.

The appeal, which came just hours before the scheduled opening of this year's National Computer Conference, was prompted by a recent Executive Committee proposal to slash $18,000 from the budgets of four of its member boards.

By far the most seriously affected of the four organizations would be ACM's chapters board, which conducts lectures, workshops and other activities that appeal mainly to the association's chapter members.

If the Executive Committee's proposal is adopted, the chapters board would have to bear $15,200 of the total spending cuts, according to 5uart Zweben, the organization's chairman. The balance of the $18,000 cutback would be divided among the other three ACM boards.

A $15,000 reduction in expenditures would trim the chapters board's available operating funds by about 10%, Zweben said, and would force the organization to pare its lecture and workshop programs.

"The level of participation [in chapters board-sponsored activities] would definitely go down," he predicted.

Strong Opposition

Zweben's words triggered a harsh response from ACM council member Herb Grosch, who voiced strong opposition to the proposed spending cuts. Grosch characterized the budget proposal as "ridiculous" and urged prompt restoration of the threatened $15,200.

He also cited the suggested cutback as another example of ACM's willingness to spend "hundreds of thousands of dollars for academic stuff and practically nothing for struggling chapters."

Grosch's comments were echoed by Puget Sound chapter member Joel Ware, who described the chapters board's activities as "one of the most important things ACM does."

Ware's and Grosch's remarks came during a 90-minute meeting that was attended by 12 members of ACM's national council and by about 35 chapters representatives.

At meeting's end, when Committee on Chapters Chairman Dahl Gerberick called for a straw ballot on the budget issue, about 30 of the chapters representatives voted disapproval of the proposed spending cuts.

CW At NCC

But with the notable exception of Grosch, most of the ACM council members in attendance withheld final judgment on the subject, the apparent reason being that they had not yet had a chance to hear the opposing side.

The proposed cuts in the chapters board's budget are said to have been prompted by the Executive Committee's dissatisfaction with ACM's current financial picture.

To remedy the reported financial woes, the committee recently proposed to slice the chapters board's projected budget for travel. Because the organization's lectures and workshops are travel-intensive by nature, the chapters board finds itself in the unfortunate position of having to bear the brunt of the recommended budget reductions.

CW Photo by [illegible]

Art imitates life at Sperry Corp. booth.

Attendees Hear Report On Natural Language Links

By Lois Paul
CW Staff

ANAHEIM, Calif. — Although there are few commercially available natural language interfaces to data bases, a number of prototype or research projects in this area are under way.

Some of their plans and directions were described during a session titled "Communicating with Data Bases in English" last week at the National Computer Conference here.

Bozena Henisz Thompson, a member of a research group with the California Institute of Technology, described the work her group is doing on a product called A Simple Knowledgeable (ASK) system, which has been implemented on a Hewlett-Packard Co. HP 9836 desktop computer in Pascal.

The ASK system enables users to ask questions that involve negations, ambiguities and conjunctions, Thompson said. If a user, for example, asks a question and follows this with a fragmented request that refers back to the first question, ASK uses an echo capability to rephrase the second request. The system also rephrases ill-formed input, she added.

"An English-Language Processing System that 'Learns' About New Domains" was the theme of the presentation made by Bruce W. Ballard, a researcher with Duke University.

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Ballard explained that his group is working on a prototype for a transportable natural language processor called Layered Domain Class (LDC). In this context, transportable refers to from one system domain of data to another domain, rather than from one processor to another. This will provide a means for ad hoc system design, customization by users of their own systems and more timely development of systems.

The LDC system differs from other natural language processors because it includes a preprocessing component that "teaches the system about the new domain," Ballard said. This facility is intended to provide a high-quality interface that handles nontrivial functions.

The knowledge acquisition or preprocessing phase involves objects, relationships and language. The user employs a menu to define entities, semantics, morphological variants (confirming new adjectives or verbs via yes/no answers), prepositional attachments and file composition.

For example, the system is intended to handle a request such as "Who received the highest grade on the final in CS152?" The LDC system would make inferences based on objects in the domain such as grade, final and CS152. The value of an adjective such as "highest" would have been computed on a scale such as "greater than or equal to B."

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ISO Member Reviews Barriers to Net Standards

By Jim Bartimo
CW Staff

ANAHEIM, Calif. — One of the goals of the International Standards Organization's (ISO) Open System Interconnect (OSI) is to allow two local-area networks to connect to each other over a public wide-area network, according to Peter Linington of the Rutherford Appleton Laboratory of the UK and a member of ISO.

CW Photo by S. Blakeney

Attendees Enjoying Presession Chatter

In a presentation on "Protocols for Computer Communications" at the National Computer Conference here last week, Linington reviewed some of the unresolved problems ISO faces in the connection of local networks to public networks.

OSI is a model for a standard set of communications protocols that contains several layers somewhat similar to IBM's System Network Architecture. If the members of ISO adopt such a standard, it could become the world standard to connect different computers.

"The main barrier to the simple and uniform view of communications desired is the wide range of technological solutions available to network constructors," Linington said. Also numbered among the barriers are:

- The differences caused by circuit-switched and packet-switched communications. One of the major differences here is that packet switching contains user-visible control functions and circuit switching does not.
- The difference between connection-oriented and datagram-oriented networks. While connections provide a certain level of communications management, the network must be provided separately for the datagram.
- The variation in the cost of communications between private local networks and public networks. Private networks are charged on the basis of capital depreciation, and public networks are charged on the basis of actual use.

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At NCC

Another problem with connecting two such networks is that they are often managed by two separate departments, Linington said. "Other problems arise when an organization divides, when two previously independent organizations combine or when existing functions are relocated at a different site," he said.

Linington predicted that these issues would stabilize in ISO in the near future. The first step will be to review current draft proposals for these connections, he said. "The major activity, which is only just beginning, is the specification of the protocols that support the convergent functions."

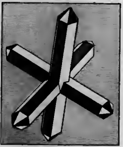
Manual Out For Auditors

CHICAGO RIDGE, Ill. — EDP Audit Associates, Inc. has released a manual for data processing auditing called "Comprehensive Information Systems Audit Manual" (Cisam).

Cisam consists of 10 chapters and 12 attachments. It includes an intensive DP audit program structured to provide a survey of a comprehensive information systems audit, a spokesman said. The techniques can be used to audit any computer system.

The manual was designed for DP and accounting auditors who are associated with computers. It also provides guidelines for executives who want to develop a DP audit function, according to a spokesman for the vendor.

The manual is priced at $25, with discounts available for volume orders. It can be ordered from Cisam D, which can be reached through P.O. Box 255, Chicago Ridge, Ill. 60415.



AI Doesn't Always Make It Easier, But Progress Seen

By Tom Henkel
CW Staff

CW At NCC

ANAHEIM, Calif. — Wouldn't it be nice if computers were more like us?

Well, they're not. They can be downright difficult to use sometimes. And artificial intelligence — the science of trying to teach computer systems to think, or at least making their users think they can think — does not always make things easier, as a number of panelists taking part in a session on artificial intelligence here at the National Computer Conference pointed out.

So far, artificial intelligence has only met with moderate success, noted Roy Maxion, a researcher at Xerox Corp. who was involved with the development of an intelligent problem diagnosis program. But in spite of the problems, there has been some progress, too.

Finding Experts

One of the biggest problems centers around finding people who are expert in specific areas and persuading them to give up their valuable knowledge for inclusion in an artificial intelligence program. It is almost impossible to get an expert to blurt out every bit of knowledge he has amassed about a given subject, noted John McDermott, a fellow panelist and senior computer researcher at Pittsburgh's Carnegie-Mellon University (CMU).

It is not that the experts are reluctant to talk with programmers trying to develop an artificial intelligence program, just that experts do not carry all their knowledge around on the tips of their tongues, he said.

McDermott has been involved since 1978 with a project to develop an intelligent computer configuration program for Digital Equipment Corp. The project, called R1, actually grew out of a problem DEC was having properly configuring its VAX-11 series processors for its users. Since DEC employs something of an "a la carte" sales strategy, getting a system configured in such a way that it met users' requests and price ranges and still worked was often difficult, McDermott explained.

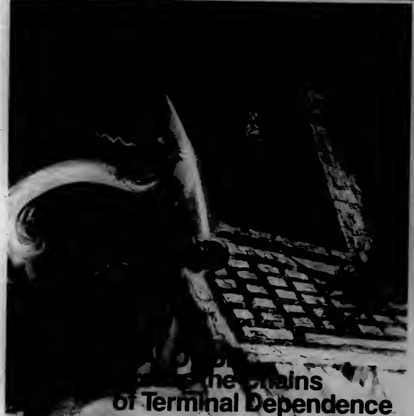
To develop the R1 intelligent configuration program, CMU researchers spent a week with DEC configuration engineers and came up with a program that covered about 250 rules for processor configuration. The program worked, but its usefulness was marginal, so DEC asked CMU to expand the program to make it more reliable.

The CMU team then spent the next five months with the DEC configuration experts and expanded the program from 250 to 750 rules, which reportedly did an adequate job of evaluating configurations and pointing out mistakes in configurations.

That was 1980. Now there are more than 2,500 rules in the DEC system, and it has been expanded to evaluate configurations on PDP-11 processors, McDermott said.

But even with this kind of study and revisions and modifications to artificial intelligence programs, computers still cannot solve every problem, noted panelist Elaine Rich, a computer science professor at the University of Texas at Austin.

The solution is to develop programs that solve pieces of problems and simultaneously teach users to use the system to their best advantage. "Help" systems, for example, sometimes can only help the user if he has a good idea of what the problem is.



Micro-OA Merger Seen

OA Pilot Projects Will Taper Off in '83: Wohl

CW Photo by S. Blakeney

Amy Wohl

By Patricia Keefe
CW Staff

CW
At NCC

ANAHEIM, Calif. — This year will mark "the beginning of the end" of small, pilot projects in office automation and set the stage for the emergence of more serious-size office systems — ones that are heavily dependent on the personal computer, according to Amy Wohl, president of Advanced Office Concepts Corp.

Speaking here last week at the National Computer Conference, Wohl detailed the struggle that is currently going on within so-called automated offices over the uncontrolled influx of personal computers and said that the merging of these small computers with traditional office systems could have an enormous effect on the word processing market as a whole.

"DP departments are installing 12 model trial systems, while at the same time trying to keep end users from purchasing 2,000 personal computers," she said. As an example, Wohl pointed to a senior-level corporate DP executive she knew who swore he controlled all personal computer purchases and that there were only about three or four in his company. Several days later, he called her back admitting that an informal equipment survey had so far turned up 800 micros and he was still counting.

Personal computers offer "neat, useful stuff," which is why they are proliferating across the business landscape, she said.

Several key issues affecting the personal computing and office automation merger were outlined at the early-week session: the proliferation of personal computers, technical cycles, hardware and software developments, standardization and computer literacy.

"The price of personal computers is becoming less than the value it has to end users, which means that personal computers are becoming a serious factor in deciding what to do about office automation," Wohl said.

Technology cycles have changed a lot over the past six to eight months, but the current hardware cycle has peaked, resulting in a lack of dazzling new products, Wohl said. Instead, we are presently seeing much enhancing and stretching of existing hardware technologies, she noted.

While Wohl expects little happening on the hardware side, she targeted 1983 as the year of software developments, particularly for personal computers. Users will be using more software to see how far they can stretch their hardware, she said.

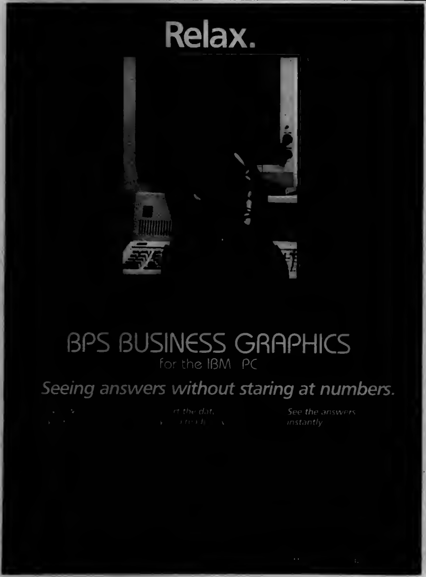
"There are distinct trends shaping up in software with regard to personal computers," including visual interfaces, increased functionality and real word processing software for personal computers, Wohl explained. However, users will need to be fairly self-sufficient in terms of maintenance and support in order to purchase word processing software from a personal computer vendor, Wohl warned.

Deltak Offers Video Series

NAPERVILLE, Ill. — Deltak, Inc. is offering a video journal series featuring James Martin titled "Local-Area Networks and Office Automation."

The course was designed for DP managers and professionals faced with integrating local-area networks into their overall communications system strategies. It provides an introduction to local-area networks and an overview of management issues, local-area network technologies and ways those technologies are used for cost-effective solutions to communications problems.

The four-course series, (number 81-73X), is available for purchase or rent through Deltak's Deltavision Library Plan. Courses are available for an average of $50 to $125 per course per month, depending on volume. The purchase price is $1,750/course, Deltak said from East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.



Micro-OA Integration Must Fit DP Environment: Wohl

By Patricia Keefe
CW Staff

CW At NCC

ANAHEIM, Calif. — Corporate DP executives planning to integrate personal computers into their overall office automation schemes need to be aware of several potential roadblocks, in particular, whether the computers can fit comfortably into a company's DP environment.

That was the message delivered here last week at the National Computer Conference by Amy Wohl, president of Advanced Office Automation Corp. During the session titled "Office Automation: State of the Art and Key Issues," the office automation guru offered a number of suggestions and guidelines for purchasing personal computers for the office.

In order to integrate personal computers into office automation, the personal computer must be usable as an alternative workstation, according to Wohl. And it is "software integration [that] makes personal computers equal office automation advanced workstations."

Most importantly, the system must fit the corporation's DP environment. "Compatibility and integration are more important than richness in function," she said, adding that all the capability in the world is useless without system compatibility.

Wohl suggested that the microcomputers should be relatively easy to use, stressing "the notion of a machine that can work with and teach" barely computer-literate end users.

Micros should also offer both individual and joint systems functions. "Without joint functions, such as electronic mail and joint access, you won't get very far," she said.

Over the next year, Wohl said, users will see a proliferation of cheaper personal computer hardware and "real" personal computer software that can be used by people who are not highly computer-literate.

Wohl rounded out her projections for 1984 by predicting that a significant drop in personal computer prices will "send word processing vendors fleeing to have fire sales before their inventory becomes obsolete."

Series Covers Strategies In Marketing

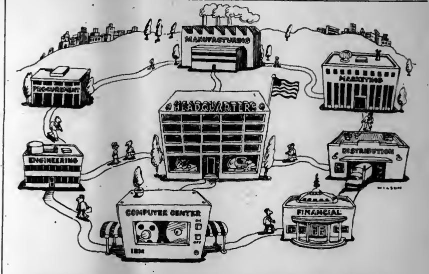
NAPERVILLE, Ill. — Deltak, Inc. has unveiled a video journal series on winning manufacturing strategies to help corporate executives meet international competition head-on.

"Successful Strategies for Manufacturing Management" was developed in cooperation with Booz, Allen and Hamilton, Inc. and is directed toward corporate, divisional and business unit executive management from marketing, finance, manufacturing, engineering and information systems areas.

The three-course series, No. 72-1XX, take 1½ to two hours to complete. It is available for purchase or rent through Deltak's Deltavision Library Plan.

Courses are available for an average of $50 and $125 per course per month, depending on volume, according to Deltak.

Courses are also available for purchase at $1,750 each, Deltak said from East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.



Should Not Be a Measure of Time

Ways to Measure OA Productivity Defined

By Robert Batt
CW West Coast Bureau

CW
At NCC

ANAHEIM, Calif. — The real role of office automation systems is to eliminate redundant effort rather than produce more work, according to Samuel Kalow, manager of office systems for IBM.

Speaking at an NCC technical session on Measuring Office Productivity, Kalow said office automation productivity should not be equated with "more." While office systems can save time through eliminating certain tasks, it is up to department managers to decide how the saved time can best be used taking into account overall corporate objectives, he said. "The way to justify an office system is to estimate how much redundant effort is saved and compare it with the cost of investment. That way you can calculate the return on investment."

The measuring of office productivity, he suggested, should not be measured in time apent on a particular task. nor is its purpose to reduce the number of people in the office.

"In meaauring office productivity, you need to look at what is the mission of a particular department or site and discover how an office system can aid a manager in that misaion," he told his audience.

Michael Hamer, another speaker at the session and an office automation consultant at MIT, said the problem with most office automation systems is that they multiply volume without increasing value.

"What is the measure of managerial productivity? It is certainly not useful to think of the office in the same terms as productivity in a factory," he remarked.

"In the office we don't make things, rather we get things done. The industrial engineering approach ia naive. Office work is a necessary evil and what we are trying to do is to make it an unnecessary evil, not more productive," he commented.

The objective of office automation, Hamer argued, is to improve organizational effectiveness. The focus should be on how people work, not on what equipment they use. The real stress must be on the decision making and design process of office systems.

Too much emphasia, he claimed, has been placed on cost reduction, which is a means to greater profitability but not the end in itself. "It is simply one of several factors and the least likely to be realized. You are not going to replace managerial labor with office automation in order to save costs," he taunted his audience.

Turning to the question of cost/benefit analysis, Hamer called it "a fraud" in most U.S. companies. "Managers do not ait down with an open mind, add up the numbers and decide what to do. Cost/benefit analysis is used as a means to justify what managers have already decided to do," he argued.

In assessing office systems, he added, users should understand the conceptual framework in which the business operates before attempting to install equipment. Cost/benefit analysis should be conducted from the beginning of the process, not at the end, Hamer pointed out.

Another speaker, Michael Packer, a lecturer in MIT'a department of mechanical engineering, told the session there ia no "meter approach" to measuring office productivity.

Knowledge work, he said, is unatructured, depends on an individual's point of view and is aubject to unforeseen results. "It is therefore dangerous to adopt a single measure or attribute as the indicator of office productivity, and if one is adopted, it can lead a company down the wrong path," he warned.

DP/OA Catalog Lists Services

CHERRY HILL, N.J. — Management Information Corp. has announced the availability of its data processing and office automation catalog called "Management'a Guide to Data Processing and Office Automation."

The catalog offers eight information aubscription services said to provide evaluationa of computer aystema and programs, special reports and consulting and market research.

The company also announced a series of evaluationa of major business microcomputer aystems called "Spotlight on Micros." The reports describe products according to equipment type, software, price and competition in the micro marketplace.

The guide is available at no charge, and "Spotlight on Micros" costs $79 from Management Information, 140 Barclay Center, Cherry Hill, N.J. 08034.

Hospital Operates Data Base to Track Patients

ROCHESTER, Minn. — Complete, accurate and current information is vital to the operation of any business; it is critical to the day-to-day functions of a hospital.

That is why the Mayo Clinic here embarked on a project to develop more sophisticated data base management techniques, mostly by putting together a data base to track patient activity within the clinic, a large group practice of medicine. Operational for more than a year, the project is producing its desired results of timely, accurate reports, noted Priscilla VanGrevenhof, an analyst/programmer with the clinic's Statistical Systems Department. "We are continually increasing the reporting capabilities of the data base."

Comprising information about patient visits in over 50 clinical specialties, the data base is updated monthly. SAS Institute, Inc.'s SAS was selected to edit and manage the data base and to generate periodic administrative reports. The clinic is running the package on an IBM 3033 under the VM operating environment.

The clinic requires for future planning information on patient visit statistics on a clinicwide basis, VanGrevenhof explained. Although tied together in one group practice, each clinical department is a separate unit. Some elements of the data base were handled by manual methods of tallying for departmental use and then entered unedited into a data set for administrative reports. The data was incomplete, and the distributed data collection resulted in cumbersome data base management, she said.

Patient Tracking

Patient tracking is used within the specialty groups to maintain appropriate levels of staffing, improve scheduling and improve departmental procedures. Patient tracking is used by the group practice administration to improve the interaction of departments, analyze work load variations, plan space utilization and maintain appropriate levels. VanGrevenhof said the success of the system depends on its ability to produce complete, accurate and current reports for the monthly meeting of various committees.

VanGrevenhof explained that the Patient Visit Analysis data base was designed by Administrative Services and Systems and Procedures departments. It was necessary for the system to be flexible enough to handle the large number of clinical departments that would be added. Strict documentation also was needed because specific data definitions for input and process vary from department to department. She noted that the system design seems to be tailored to the needs of individual users.

The components of the data base system include data entry and editing, data base and report generation. Coding of data entry forms is handled by the clerical personnel in each department. SAS is used to edit the data on a weekly basis.

After verification is made on the identification fields, all other checks for consistency, validity and ranges are done on a specialty basis. This is accomplished by a different SAS macro for each specialty. This reportedly provides for documentation of the section of code pertaining to a specialty and also allows for ease of maintenance of the program.

Once the data collection and editing are completed for the month, the raw data is converted into an SAS data set and the data base is updated. VanGrevenhof noted that one job stream handles all of the processing with a series of job steps.

The first file created is the daily activity of the specialty. The SAS variables are created with only one calculated variable added — an SAS date. Variables are labeled with the same wording used on the coding instrument for documentation purposes.

Each daily file has over 12,000 entries per year. The current year's file is updated with the new data, and a pointer data set is updated for use to speed up retrievals with an inverted list.

OA Solves School District's Overload Problem

OAKLAND, Calif. — The 100-school Oakland Unified School District must communicate regularly with 48,000 students and their parents, approximately 6,000 employees at 200 locations and scores of community, labor and government organizations.

Add to this challenge the effects of Proposition 13 on the state school system and the task of communicating becomes even more difficult.

Faced with budget cuts and reduced teaching staffs, the Oakland school district turned to office automation to solve its administrative overload problem.

Mass Mailing Slow

Without an automated system, a mass mailing of a single letter could take weeks. First, an office had to send a request to the district computer center for the name and address of everyone who fell into the mailing list category. Then the computer center ran a special program and sent the information to the requesting office in a hard-copy report — a process that took two days to complete.

Several employees in the requesting office then would have to type the name and address of each person selected by the computer program on the individual letter and on individual envelopes. This process would take several additional days, according to Jerry Ardissone, director of data processing for the district.

The new system allows names and addresses to be merged with a letter. Envelopes can be printed from the same list — cutting the process down to five days and the number of employees down to one. "With our budget situation, we can't add to our clerical staff, so we have to make sure our present employees are as productive as possible by giving them the best tools available," Ardissone said.

Compared Merits

Ardissone said he initially compared the merits of stand-alone word processing systems against a system running on a central processor that could support many users. He chose the latter approach to avoid different departments competing for computer empires and to reduce training costs for the district's highly mobile clerical staff.

"We promote from within, which creates considerable movement between departments," Ardissone said. "With one system, we won't have to invest time and money to retrain the clerical staff on different systems as they change jobs."

Once the decision to purchase a central system had been made, the school district installed in four district departments Honeywell, Inc. Office Automation Systems (OAS) running on a DPS 6/74 16-bit small computer. The OAS systems allow the districts to integrate data and word processing and to communicate with the Honeywell DPS 8/44 mainframe, Ardissone said.

"Many of our office applications require information stored on the mainframe," Ardissone said. "So it was very important to have a system that would allow us to transfer data from the host and use it in word processing tasks," he said.

Consultants Up Productivity 50% With Local Net

READING, Pa. — Professionals at Gilbert/Commonwealth realized productivity gains of up to 50% on certain tasks while cutting the time it takes to perform them by 70% with management workstations and a local-area network.

Gilbert/Commonwealth is a worldwide consulting firm that manages power plant and transmission line design and construction projects.

"Our work is advanced and interdisciplinary," according to Barry Pierce, manager of information processing technology. "Our projects use text, diagrams, engineering drawings and computer data.

"We need much more than conventional clerical and data duties. We need a system that lets us create and revise all of these types of information, combine them and move the results quickly among our people and out to our clients — regardless of distance," he said.

Selection Made

In order to do that, the company selected Xerox Corp.'s Ethernet local-area network and its associated workstations, word processors and microcomputers.

"Ethernet has the protocols to permit the integration of several forms of information into a single network," Pierce said. "It provides a unifying factor for information processing."

The 50% productivity gains came through the use of Xerox's 8010 Star professional workstations, which offer integrated text and graphics capabilities.

With them, the company also achieved reductions of up to 70% in the time it takes to prepare proposals and other documents.

Ethernet's worldwide electronic mail capability aids Gilbert in putting its resources wherever there is a job to be done. When a project requires it, the company can combine the talents of employees all over the world.

The combination of electronic mail with professional workstation capabilities also cuts response time. Engineers in larger offices can use their 8010 workstations to review reports electronically mailed from remote offices. Clients receive them in less than half the pre-Ethernet time.

The equipment tied into the network includes Xerox 860 information processing systems, used for word processing and communications at Gilbert/Commonwealth's U.S. and overseas offices, and 8010 workstations used by technical and proposal writers to create documents.

Employees Own Micros

Over 17% of the company's employees own a personal computer under a company-sponsored purchase program. Work done at home on these computers can be sent via electronic mail to an 8010 for final revisions.

Even the company's clients use electronic mail to send messages directly into the firm's Ethernet or to a communicating 860.

Looking to the future, Pierce said, "The Ethernet architecture gives us flexibility and expandability. By using equipment from Xerox and other vendors, we expect to develop an integrated information processing system that will provide the leading-edge advantages we must have to meet the challenges ahead."

Productivity, Staff Morale Boosted

Lab Cures Paperwork Deluge With OA System

SPOKANE, Wash. — Installing office automation equipment resulted in an estimated 50% productivity boost and higher staff morale at Pathology Associates (PA) here.

PA is an independent, full-service anatomic and clinical pathology laboratory. It is involved in studying and diagnosing diseases and other related work.

Before purchasing the Wang Laboratories, Inc. system, PA generated a large amount of paperwork that was a constant challenge to keep in order. When, for example, a courier service delivered tissue samples to the Spokane laboratory for a histology report, a pathologist would first dictate a gross description identifying the type of tissue and its origin. All of the pathologist's dictation had to be typed manually.

Then a microscopic slide of the tissue would be processed and a report dictated and typed. The two reports and the slide would then be combined to produce a final report that offered a pathological diagnosis. Finally, the completed pathological report would be returned by courier service to the doctor who took the original sample.

Week's Wait

The process resulted in nearly a week's wait for patients in outlying areas, while patients close to the laboratory could receive reports in about a day.

The addition of two IBM Mag Card 1 data entry terminals and a memory typewriter was helpful, but not enough, according to former PA word processing supervisor Enid LaCombe, who has since joined Wang. "They improved our productivity to a certain level," she said. "But they were limiting our potential for growth."

LaCombe said upgrading that system would have necessitated more storage space for patient and bookkeeping files, more people to file and retrieve information, more money for more salaries and a "continuous sea" of paper. She decided to buy a word processing system.

She selected the Wang Office Information System (OIS) 130A, consisting of a master with a 10M-byte disk capable of retaining up to 4,000 pages; three 48K-byte workstations and keyboard workstations; a Model 6581W 40 char./sec daisywheel printer; a Model TSF 31 twin-sheet feeder; and a 120 char./sec dot matrix printer.

Offers Adaptability

The system supports up to 14 workstations, offering adaptability to PA's growing needs.

With the Wang system, the same general procedure is used for reports, but PA staff now can produce them about 50% faster because corrections can be made so much more quickly with the CRT display.

Several features of the OIS system impressed LaCombe. One was the ability to edit quickly, accurately and efficiently. The system's editing capabilities proved to be particularly useful in producing not only the laboratory quarterly newsletters, but also numerous daily reports.

Another feature she liked was the ease of use of the system. "We couldn't stop work in the transition period while our six operators learned to use the new system," she stated. "We needed a high level of productivity in a short time, and with Wang we got it."

All six operators completed a 1½-day personalized training program, using audio tapes and equipment at a nearby Wang office.

LaCombe also was impressed with the adaptability of software to the system. This was important because software is constantly changing and improving, according to LaCombe. The Wang OIS can be expanded without reprogramming the existing software.

To meet additional business needs, PA can purchase a new workstation, plug it in and, using the existing software, go to work.

Other Considerations

Service and support of the system were other considerations for LaCombe. "We could not afford to wait long for service people to arrive in the event of a breakdown," she noted. "Therefore, we wanted a system that was supported by a local vendor."

The Wang system is now used for all histology and cytology reports, autopsies, correspondence, minutes of board and sectional meetings, memos and technical procedures for updates of various company manuals.

It is also employed in producing purchase orders and financial reports, keeping medical logs and preparing all Medicare forms, of which there are about 1,500 to 2,000 monthly.

"Before we obtained the Wang system, it took two staff members 10 hours a week to complete these forms," LaCombe declared. "Now, one staff member can complete them all in 2½ hours."

Finance Firm Liquidates Tasks With System

ATLANTA — Success brings some burdens, as in the need to expand DP resources to meet rising demands. Trusco, a financial service bureau that performs DP work for its holding company, the Trust Company Bank of Georgia, and about 140 other banks, was faced with such a problem early last year.

Trusco does much of its work in batch on IBM 3033 and 3081 mainframes. The company also communicates daily with National Data Corp., whose cash management service provides balance information to commercial accounts in many financial institutions.

Trusco's system for batch transmission "was a procedural headache," according to Leonard Sutton, vice-president of technical services at Trusco. "The facility we were using was highly labor-intensive, using a Mohawk [Data Sciences, Inc.] tape drive and other pieces of data communications equipment."

Manual System

Under the manual system, the Trusco operator would first establish voice contact with the other data center, then mount a tape and monitor the transmission until completion. Often, tapes had to be transported manually, Sutton said.

"Under the old method, we could not do more than one transmission at a time without leasing more equipment," he said. With the data center "approaching a capacity problem," Trusco started looking for a facility that would handle batch bisynchronous transmission.

Trusco found that Software Module Marketing, Inc.'s Teleprocessing Remote Access Control System (SMM/Tracs) was the only product that fit the bill. "We would have used SMM/Tracs years ago had it been available, because the other alternatives that we have used were not at all adequate," Sutton said. Trusco installed SMM/Tracs last summer.

"SMM/Tracs eliminates the manual handling of tapes, diskettes and the need for additional transmission equipment beyond what we already had in place," Sutton said. The product is easily tailored to individual operations, he said, so that "to operations personnel, SMM/Tracs looks like any other job that runs."

'Everything Became Instantaneous'

Bank Fills Productivity Bill With On-Line Tool

RICHMOND, Va. — An on-line program development system has filled the productivity bill for the data center of a small savings and loan firm here.

"When we acquired Owl [software from Pansophic Systems, Inc.] in 1979, everything became instantaneous," according to Lindsey Bourne, systems programmer at Franklin Federal Savings and Loan Association.

"We no longer had to worry about line numbers. Instead, it gave us instant access to programs, and we could immediately see changes that we had made by calling up a screen."

Bourne explained that the bank had formerly worked with card files. "We had a cabinet of card decks, and we had to flip through cards, write the program on a coding pad — which took a long time — and then take it to the keypunch operator for punching. After checking those cards, we finally could compile and test and see if the program ran. But if anyone misplaced the source deck, we were left without a program," she said.

No Difficulty Learning

The programmers at the bank had no difficulty learning to use the new on-line development tool, according to Bourne. "The tutorial features of the software make Owl easy to learn," she contended. "In an afternoon, a programmer can become fairly proficient with it. We have found no need for a formal training program."

Carlyle Williams, the DP manager at the bank, said Owl is now being used for all program development work done by his group. "It does an excellent job. With Owl, we have developed applications for payroll, for our savings program, loan applications systems and many others," he said.

Furthermore, Williams noted that the utility programs have proven especially useful to his staff. "We are able to adjust older programs using Owl when we need to write new ones."

Copy Features

Owl's copy features let programmers lift code from existing bank programs, Bourne noted. "It lets you copy code, which you know is already correct, from one program to another. I cannot remember the last time I wrote a program completely from scratch. I use the Owl library to access older programs and copy for new ones."

Thus, Bourne said, Owl is used as both a librarian and as a program development system.

Bracketing Capability

Another feature of Owl is its bracketing and pointing capability. "The feature allows you to program the way that you think," she asserted. "It allows you to manipulate your screen back and forth, and there is no need to use line numbers or predesigned segments of code.

"At one point, we were involved in changing the rate field in our savings records, when variable rates were introduced," she explained. "We had to expand the rate field from a one-byte code to a five-digit number. We had to find out which savings programs specifically accessed that rate field. With Owl, we just did a search to locate programs that would have failed if we didn't make a change to the data description."

Bourne's results were successful. "Owl saved us a lot of time and headaches. Using the search facility, we were able to find programs that had to be changed so that they wouldn't fail."

Bourne noted that the bank's decision to purchase Owl was originally based on convenience, but it eventually turned out to be a great find. "It was an on-line extension of the software we had in batch . . . but in comparison, Owl is 10 times faster."

Apparel Chain Speeds Conversion With Course

HOUSTON — A training program that features a step-by-step approach has enabled a retail clothing chain here to facilitate a changeover to new computers with a minimum of expense and time.

Walter Pye's is a Houston-based group of men's and women's apparel stores, employing approximately 500 people and operating five stores — four in Houston and one in Galveston, Texas.

In April 1982, the company converted from an NCR Corp. Criterion 8450 to a Prime Computer, Inc. Information series Model 750, redesigning the system and making what DP director Ron Waddell called "a massive change." It was necessary for the DP staff to become self-reliant as quickly as possible, not only to prevent any interruption in the operation of the company, but also to provide instruction for new users, who were eager to "get their hands on the computer," he said.

Task Simplified

A training course prepared by Software Management Systems (SMS) of Englewood, Colo., greatly simplified this task. SMS offers software products designed to run on the Prime minicomputer. The SMS program was designed to teach students with little or no computer experience, according to Fred Eyerman, SMS training manager. Clients can either go to the SMS facility for training or use self-instruction manuals in the work place.

At least one client employee is invited to take the course at the SMS facility in Englewood so that SMS staff can explain any problem areas. In turn, SMS uses feedback from students to aid in the update of the program.

The training program starts with a hands-on course in Inform, the Prime Information series report generator. The course enables new students to use computer equipment in a nonthreatening, high-reward environment, Eyerman said.

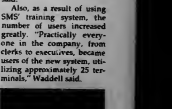
The second course presents a foundational overview of computers and the Information series. Each succeeding course builds step by step on this foundation.

'Enjoyable' Courses

The 11 courses normally take four to five full eight-hour days to complete. A twelfth course, Info/Basic, builds on the preceding 11 and introduces the basic commands of the Information system's programming language. Additional training is provided for users of Escape, a program generator offered by SMS for use with the Information series.

Pye's DP staff took the first part of the course themselves, but Waddell and two other staffers went to Colorado for training by SMS in Escape. "In addition to being instructional, the courses were easy to follow and were quite enjoyable," Waddell said.

Also, as a result of using SMS' training system, the number of users increased greatly. "Practically everyone in the company, from clerks to executives, became users of the new system, utilizing approximately 25 terminals," Waddell said.



Users Rate Basic Four Over Alpha Micro Minis

(Continued from Page 1)

Basic Four, despite its Datapro win and number of satisfied users, finished a surprising 11th when its users were asked if they would recommend their systems to other users; 15% said they would not tell other users to buy the systems.

Other Survey Findings

Some other findings of the survey:

- Minicomputers from Datapoint Corp. placed fifth in terms of overall user satisfaction. However, 93% of the Datapoint users surveyed said they would recommend their machines to other users, placing the company third in that category behind Alpha Micro and Altos Computer.
- Once again, IBM and DEC contributed the largest number of users to the survey — a total of 1,112 users owning 1,366 systems — but could not finish higher than seventh and 11th, respectively. Sandwiched in between IBM and DEC in eighth, ninth and 10th place in terms of overall satisfaction were NCR Corp., Prime Computer, Inc. and Wang Laboratories.
- Point Four, Texas Instruments, Inc. and Microdata Corp. occupied positions 11 through 13. All three slid at least five notches compared with last year's showing.
- Burroughs Corp. was another major player to take a tumble on this year's user charts, dropping from last year's ninth place finish to 14th place. A little over 11% of the Burroughs users, which was the fourth largest group of users represented by the survey, said they plan to change vendors during the next year, and another 12% said a change of vendors is a possibility.
- Four of the last seven finishers were companies owning a significant share of the minicomputer market. They include Perkin-Elmer Corp. (No. 15), DG (No. 16), Honeywell, Inc. (17) and Harris Corp. (19).
- For the fourth consecutive year, systems from General Automation, Inc. placed dead last. While the company was represented by only six respondents in the survey, four of those six said they could not recommend their systems to other users; only two said their systems lived up to performance expectations, and two plan to switch vendors over the next year, with two more weighing that possibility.

Datapro Survey Polls Readers

DELRAN, N.J. — The results of Datapro Research Corp.'s 1983 survey of computer systems are based on returns from a mailing of 15,033 questionnaires sent to a cross-section of *Computerworld* readers. Users were asked to rate their mainframes and minicomputers in 14 different categories.

Of the 15,015 questionnaires sent out, 4,329 responses were received from 4,103 respondents, a return rate of 27%. Datapro judged 511 of the 4,329 returns invalid, leaving a total of 3,818 valid responses from 3,592 users with a total of 4,957 installed systems.

Copies of the "1983 User Rating of Computer Systems" can be obtained for $25 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Poor Response Time Reported Biggest Gripe Of Users Surveyed; Wang Users Content

By Ed Scannell
CW Staff

DELRAN, N.J. — Poor response time was the No. 1 problem reported by respondents to Datapro Research Corp.'s annual survey of minicomputer and small business system users.

Wang Laboratories, Inc. had the highest number of content users in this category, with 74% saying their systems' response time is acceptable. Only 56% of the Digital Equipment Corp. users and 55% of the IBM users surveyed are happy with their systems' response time.

Systems from Management Assistance, Inc.'s top-rated Basic Four Information Systems Division could satisfy only 55% of its surveyed users' response time needs.

Late delivery of both hardware and software were two other popular user complaints. A little over 19% of Data General Corp.'a users and 12% of the DEC users surveyed said they experienced late delivery of necessary software.

The major complainers about tardy hardware were users of Burroughs Corp. and Four Phase Systems, Inc. systems, with 27% from each group saying their gear was late. Thirteen percent of the DEC users surveyed also complained about hardware that arrived after the promised delivery date.

Vendor Loyalty Strong

Most users surveyed plan to keep their systems over the coming year. The majority of those planning to replace their systems in 1983 will do so with one made by their present vendor, rather than switching vendors.

For example, 94% of the VAX-11 users polled plan to hang on to those DEC machines; 5% plan to replace them with an upgrade from DEC; and the remaining 1% will replace them with a competitor's system. Approximately 9% of the PDP-11 users queried plan to upgrade with DEC equipment in 1983; less than 2% of those users will trade in their systems for another vendor's.

While a very low percentage of IBM users plan to switch vendors, a significant number of System/3 (28%) and System/32 (23%) users said they will upgrade over the next 12 months. Among System/34 users, 9% said they will upgrade with IBM equipment, while only 1% expect to change manufacturers over the next 12 months.

System/38 users were even more loyal to Big Blue, with 1.64% planning to add IBM upgrades. Not one System/38 user surveyed plans to swap its system for that of another vendor.

But not all IBM users are happy with their systema. Fifteen percent of the IBM Series/1 users canvassed said they would be replacing their systema with one made by another manufacturer. Another 5% plan to trade in their systems, but didn't know which vendor they would be turning to for a replacement. In last year's survey, all 45 Series/1 users said they had no plans to make a system swap with a competing vendor.

Other vendors that had a significant number of users planning to defect include General Automation, Inc. (33%), Four Phase (21%), Harris Corp. (20%) and Microdata Corp. (14%).

Software Strategies

While most users said they develop their application packages in-house, they also depend heavily on "packaged" programs provided by the vendor and programs created by third parties. For instance, VAX users said 37% of their software was developed by DEC and bundled in with their system, while 27% was provided by independent suppliers.

System/34 users also indicated an even breakdown between bundled and third-party software, with 44% of their software bundled and 33% provided by third parties.

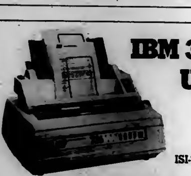
System/38 users were more democratic about where they obtained their software, with 43% saying it was bundled in with their hardware and 38% saying they purchased it from the independents.

Few IBM Users Seen Buying

DELRAN, N.J. — IBM users have a greater tendency to lease their systems either from the company or from a third-party supplier than to purchase them from IBM, Datapro Research Corp. found in its annual survey of minicomputer and small business system users.

The survey statistics show that 23% of IBM users lease from IBM, with another 13% leasing from third parties.

Only one system, the 5280, was leased (62%) more than it was purchased (25%), according to Datapro figures.



Users Rate Their Small Machines . . .

Survey Item \ Manufacturer and Model	Alpha Micro All Models	Altos All Models	Burroughs B 800 & B 1800	Burroughs B 90	Burroughs B 800	Burroughs B 1800	Data General CS Series	Data General Eclipse	Data General MV Series
No. of User Responses	16	15	56	7	9	56	13	43	16
No. of Systems Represented	61	16	61	12	8	60	14	65	22
Avg. Life of System (Mos.)	34.8	19.9	46.1	33.8	31.2	7.14	34.0	46.7	18.8
Plans for system replacement in 1983 (%)									
Yes, Same Manufacturer	18.75	14.29	20.00	0.00	0.00	1.79	0.00	17.07	0.00
Yes, Vendor Unknown	0.00	7.14	0.00	14.29	0.00	8.36	0.00	2.44	0.00
Yes, Different vendor	0.00	0.00	6.48	0.00	0.00	3.57	0.00	9.76	6.67
No	81.25	78.57	74.88	85.71	100.00	86.28	100.00	70.73	33.33
Significant Advantages (%)									
Users are happy with response time	66.67	66.67	39.29	57.14	77.78	53.57	46.15	64.76	80.00
System is easy to expand/reconfigure	66.67	66.67	60.71	42.86	66.67	76.79	53.85	57.14	73.33
System costs were less than expected	46.67	46.67	16.07	0.00	22.22	14.38	0.00	7.14	20.00
Programs/data carried over from other systems are compatible, as vendor promised	46.67	46.67	64.67	57.14	44.44	57.14	30.77	26.19	60.00
Terminals/periph. carried over from other systems are compatible, as vendor promised	46.60	40.00	33.93	42.86	44.44	38.71	23.08	14.29	40.00
System is power/energy efficient	60.00	60.00	16.64	28.57	11.11	37.50	15.38	9.52	33.33
Productivity aids help us keep programming costs down	33.33	33.33	41.07	14.29	44.44	41.07	30.77	26.19	33.33
Data base language is efficient and effective	40.00	40.00	61.07	0.00	0.00	48.43	0.00	11.90	60.00
Delivery and/or installation of equipment was ahead of schedule	40.00	40.00	8.36	0.00	44.44	21.43	7.69	11.90	26.67
Delivery of required software was ahead of schedule	33.33	33.33	3.57	0.00	11.11	12.50	15.38	9.52	20.00
Significant Problems (%)									
Computer proposed by vendor was too small	0.00	0.00	8.93	14.29	0.00	8.38	15.38	14.29	13.33
Installation of equipment was late	0.00	0.00	26.79	42.86	33.33	30.00	15.38	11.90	13.33
Delivery of required software was late	0.00	0.00	8.93	28.57	33.33	8.93	7.69	19.08	26.67
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	0.00	0.00	10.71	57.14	0.00	3.57	15.38	16.67	20.00
Vendor did not provide all the promised software or support	6.25	0.00	8.92	14.29	11.11	16.84	23.08	31.43	18.33
Program/data compatibil. not what vendor promised	0.00	0.00	3.57	14.38	0.00	1.79	0.00	9.52	6.67
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	1.78	0.00	0.00	3.57	0.00	4.76	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	12.50	6.67	14.29	28.57	11.11	12.50	15.38	16.67	18.33
Equipment is excessively noisy	6.25	6.67	7.14	0.00	11.11	7.14	7.69	2.38	13.33
Power and/or cooling requirements are excessive	6.25	0.00	1.78	0.00	0.00	1.78	7.68	3.38	6.67
System Ratings (4.0-1.0)									
Ease of Operation	3.75	3.63	3.60	3.71	3.67	3.66	3.42	3.31	3.20
Reliability of Mainframe	3.66	3.87	3.29	3.43	3.56	3.40	3.38	3.60	3.40
Reliability of Peripherals	3.56	3.83	2.78	3.00	3.25	3.06	3.17	3.24	3.00
Maintenance Service:									
Responsiveness	3.27	3.82	3.11	3.08	3.44	3.06	3.38	3.34	3.60
Effectiveness	3.38	3.82	2.77	3.14	3.33	3.06	3.00	3.27	3.20
Technical Support:									
Trouble-shooting	3.06	3.00	2.63	2.87	2.67	2.40	2.82	3.79	2.80
Education	2.71	2.86	2.51	2.33	2.22	2.66	3.20	2.96	2.80
Documentation	3.13	2.86	2.11	2.29	2.80	2.22	2.40	2.28	2.57
Manufacturer's Software:									
Operating System	3.61	3.40	3.30	3.71	3.22	3.06	2.33	3.11	2.87
Compilers & Assemblers	3.63	3.33	3.16	3.43	3.22	3.22	2.78	2.86	3.87
Applications Programs	2.86	3.27	3.00	3.50	2.00	2.67	3.00	2.67	2.79
Ease of Programming	3.86	3.36	3.11	3.00	3.14	3.26	3.75	3.03	3.20
Ease of Conversion	3.42	3.31	3.08	3.33	3.26	2.26	3.17	3.06	3.07
Overall Satisfaction	3.63	3.53	3.11	3.00	3.00	3.23	3.08	3.16	3.60
Did the system do what you expected it to do? (%)									
Yes	100.00	100.00	90.91	85.71	88.89	92.73	80.00	90.24	73.33
No	0.00	0.00	7.27	14.29	11.11	1.82	10.00	7.32	26.67
Haven't decided	0.00	0.00	1.82	0.00	0.00	5.45	10.00	2.44	0.00
Would you recommend system to another user? (%)									
Yes	100.00	100.00	85.64	85.71	77.78	81.82	75.00	85.37	80.00
No	0.00	0.00	14.86	14.29	22.22	5.45	16.67	14.63	20.00
Haven't decided	0.00	0.00	16.07	0.00	0.00	12.73	8.33	0.00	0.00

Survey Item \ Manufacturer and Model	Data General NOVA	Datapoint ARC	Digital Equipment PDP 1103 & 1123	Digital Equipment PDP 1134 & 1144	Digital Equipment PDP 1170	Digital Equipment PDP-11 (Other models)	Digital Equipment VAX	Four-Phase all Models	General Automation All Models
No. of User Responses	23	61	44	91	85	11	99	33	[illegible]
No. of Systems Represented	37	143	98	118	143	35	140	40	[illegible]
Avg. Life of System (Mos.)	53.0	41.8	31.8	46.7	[illegible]	81.4	37.7	[illegible]	[illegible]
Plans for system replacement in 1983 (%)									
Yes, Same Manufacturer	13.04	3.33	18.28	18.98	9.41	9.09	4.04	18.18	0.00
Yes, Vendor Unknown	4.38	1.67	3.33	6.67	1.18	0.00	1.01	0.00	16.67
Yes, Different vendor	4.38	8.33	3.33	3.33	3.53	0.00	1.01	81.21	33.33
No	78.26	81.67	78.07	74.44	85.88	90.91	93.94	90.91	50.00
Significant Advantages (%)									
Users are happy with response time	43.48	56.74	40.91	47.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
System is easy to expand/reconfigure	43.86	81.80	56.91	54.95	[illegible]	[illegible]	70.79	[illegible]	[illegible]
System costs were less than expected	8.70	24.86	18.18	12.09	11.76	27.27	18.18	9.09	[illegible]
Programs/data carried over from other systems are compatible, as vendor promised	30.43	36.34	36.36	25.27	21.18	27.27	27.27	12.12	[illegible]
Terminals/periph. carried over from other systems are compatible, as vendor promised	13.04	33.75	38.38	27.47	31.18	[illegible]	[illegible]	[illegible]	[illegible]
System is power/energy efficient	8.70	21.61	22.73	19.86	14.12	18.18	[illegible]	[illegible]	[illegible]
Productivity aids help us keep programming costs down	13.04	22.86	20.45	15.38	[illegible]	[illegible]	43.47	[illegible]	[illegible]
Data base language is efficient and effective	8.70	22.95	2.27	13.19	18.82	18.18	[illegible]	[illegible]	[illegible]
Delivery and/or installation of equipment was ahead of schedule	16.64	34.86	4.55	7.69	7.06	9.09	[illegible]	[illegible]	[illegible]
Delivery of required software was ahead of schedule	8.70	9.84	4.55	4.40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Significant Problems (%)									
Computer proposed by vendor was too small	17.38	8.86	6.82	17.98	5.88	18.18	10.10	6.06	16.67
Installation of equipment was late	4.38	13.11	18.44	18.38	5.88	0.00	20.20	27.27	0.00
Delivery of required software was late	21.74	14.76	11.38	18.48	9.41	9.09	13.13	18.18	0.00
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	8.70	8.20	6.82	18.88	14.12	18.18	14.14	12.12	0.00
Vendor did not provide all the promised software or support	34.78	18.38	6.82	18.38	8.24	9.09	6.06	21.21	33.33
Program/data compatibil. not what vendor promised	4.38	4.92	2.27	4.40	1.18	9.09	1.01	12.12	0.00
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	2.27	1.10	0.00	9.09	0.00	3.03	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	8.70	27.87	4.55	18.38	11.76	0.00	13.13	12.12	83.33
Equipment is excessively noisy	8.70	8.20	11.38	10.99	4.71	18.18	12.13	0.00	16.67
Power and/or cooling requirements are excessive	8.70	0.00	4.66	6.49	7.06	9.09	4.04	0.00	0.00
System Ratings (4.0-1.0)									
Ease of Operation	3.27	3.40	3.81	3.50	3.51	3.45	2.94	[illegible]	[illegible]
Reliability of Mainframe	3.66	3.66	3.79	3.47	2.57	3.73	3.48	[illegible]	[illegible]
Reliability of Peripherals	3.17	3.26	3.66	3.36	3.16	2.86	3.26	[illegible]	[illegible]
Maintenance Service:									
Responsiveness	3.09	3.84	3.41	3.40	3.35	2.60	3.20	[illegible]	[illegible]
Effectiveness	3.14	3.30	3.27	3.19	3.16	2.73	2.21	[illegible]	[illegible]
Technical Support:									
Trouble-shooting	2.70	3.30	2.67	2.83	2.84	2.88	2.87	[illegible]	[illegible]
Education	2.40	3.06	2.96	2.87	2.77	[illegible]	[illegible]	[illegible]	[illegible]
Documentation	2.13	2.66	3.06	2.86	2.70	[illegible]	[illegible]	[illegible]	[illegible]
Manufacturer's Software:									
Operating System	3.30	3.43	3.34	3.22	3.37	[illegible]	[illegible]	[illegible]	[illegible]
Compilers & Assemblers	3.00	2.86	3.32	3.40	3.21	[illegible]	[illegible]	[illegible]	[illegible]
Applications Programs	2.44	3.13	3.44	2.94	2.80	[illegible]	[illegible]	[illegible]	[illegible]
Ease of Programming	2.86	3.46	3.30	3.14	3.20	[illegible]	[illegible]	[illegible]	[illegible]
Ease of Conversion	2.21	3.04	3.17	2.76	2.80	[illegible]	[illegible]	[illegible]	[illegible]
Overall Satisfaction	3.00	3.43	3.46	3.14	3.35	[illegible]	[illegible]	[illegible]	[illegible]
Did the system do what you expected it to do? (%)									
Yes	82.61	93.44	90.91	82.42	92.94	72.73	85.86	34.38	33.33
No	13.04	3.28	4.55	8.79	2.35	18.18	4.04	12.50	33.33
Haven't decided	4.35	3.28	4.55	8.79	4.71	9.09	10.10	3.13	33.33
Would you recommend system to another user? (%)									
Yes	65.22	93.44	90.91	75.82	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
No	13.04	4.92	4.55	6.59	4.71	18.18	1.01	[illegible]	[illegible]
Haven't decided	21.74	1.64	4.55	16.48	9.41	[illegible]	[illegible]	[illegible]	[illegible]

Honeywell announces help for companies besieged by an army of personal computers.

"Overrun."
"Invaded."
"Swamped."

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* CP/M-86 is a registered trademark of Digital Research, Inc. MS DOS is a registered trademark of Micro Soft, Inc.

Users Rate Their Minicomputers . . .

Survey Item \ Manufacturer and Model	Harris All Models	Hewlett-Packard 85, 86, & 87	Hewlett-Packard 250 & 300	Hewlett-Packard 1000	Hewlett-Packard 3000	Hewlett-Packard 9800	Honeywell DPS 6	Honeywell Level 6	IBM Series/1
No. of User Responses	15	9	10	15	183	7	16	20	40
No. of Systems Represented	20	16	12	28	236	16	25	31	65
Avg. Life of System (Mos.)	43.6	27.3	30.8	94.2	36.9	45.0	21.9	43.8	43.1
Plans for system replacement in 1983 (%)									
Yes, Same Manufacturer	6.67	44.44	10.00	7.14	10.44	28.57	6.25	5.00	5.00
Yes, Vendor Unknown	0.00	0.00	0.00	0.00	1.10	0.00	0.00	0.00	5.00
Yes, Different vendor	20.00	0.00	10.00	7.14	0.55	0.00	0.00	5.00	15.00
No	73.33	55.56	80.00	85.71	87.91	71.43	93.75	90.00	75.00
Significant Advantages (%)									
Users are happy with response time	60.00	33.33	70.00	46.67	92.20	28.57	43.75	65.00	42.50
System is easy to expand/reconfigure	46.67	44.44	70.00	60.00	85.79	57.14	87.50	85.00	65.00
System costs were less than expected	33.33	33.33	0.00	13.33	12.57	0.00	0.00	15.00	20.00
Programs/data carried over from other systems are compatible, as vendor promised	0.00	11.11	10.00	26.67	33.88	14.29	18.75	25.00	10.00
Terminals/periph. carried over from other systems are compatible, as vendor promised	6.67	11.11	10.00	26.67	16.75	14.29	0.00	35.00	15.00
System is power/energy efficient	6.67	11.11	20.00	0.00	25.61	14.29	81.25	10.00	32.50
Productivity aids help us keep programming costs down	6.67	22.22	40.00	40.00	46.45	14.29	6.25	25.00	22.50
Data base language is efficient and effective	6.67	11.11	50.00	26.67	75.66	28.57	6.25	30.00	15.00
Delivery and/or installation of equipment was ahead of schedule	6.67	11.11	0.00	6.67	24.04	0.00	6.25	15.00	12.50
Delivery of required software was ahead of schedule	6.67	0.00	0.00	6.67	14.21	0.00	18.75	5.00	7.50
Significant Problems (%)									
Computer proposed by vendor was too small	6.67	0.00	10.00	6.67	6.56	0.00	0.00	20.00	12.50
Installation of equipment was late	13.33	11.11	20.00	6.67	7.10	14.29	6.25	25.00	20.00
Delivery of required software was late	13.33	0.00	10.00	13.33	4.92	28.57	18.75	15.00	17.50
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	6.67	11.11	0.00	20.00	6.28	28.57	0.00	20.00	17.50
Vendor did not provide all the promised software or support	40.00	11.11	20.00	6.67	5.46	0.00	31.25	20.00	20.00
Program/data compatibil. not what vendor promised	6.67	0.00	0.00	0.00	4.27	14.29	0.00	15.00	12.50
Terminals/peripherals compatibility not what vendor promised	13.33	0.00	0.00	6.67	2.73	0.00	6.25	10.00	10.00
Vendor enhancements/changes to hardware/software hard to keep up with	20.00	0.00	0.00	26.67	7.65	14.29	12.50	20.00	15.00
Equipment is excessively noisy	6.67	0.00	0.00	6.67	3.28	14.29	0.00	20.00	0.00
Power and/or cooling requirements are excessive	6.67	0.00	0.00	0.00	2.19	0.00	6.25	15.00	0.00
System Ratings (4.0-1.0)									
Ease of Operation	3.40	3.75	3.70	2.93	3.62	3.71	3.31	3.35	3.22
Reliability of Mainframe	3.00	3.75	3.70	3.87	3.76	2.86	3.38	3.46	3.74
Reliability of Peripherals	2.67	3.44	3.80	3.47	3.60	3.71	3.38	3.22	3.36
Maintenance Service:									
Responsiveness	2.93	2.71	3.20	3.50	3.38	3.67	3.25	3.20	3.38
Effectiveness	2.73	4.00	3.65	3.33	3.44	2.86	3.25	2.65	3.22
Technical Support:									
Trouble-shooting	2.85	2.86	3.33	2.93	3.08	3.20	2.80	2.86	2.82
Education	2.40	3.00	3.22	3.07	3.07	2.75	3.00	2.86	2.53
Documentation	2.07	3.38	3.33	2.80	2.61	3.17	2.88	2.25	2.67
Manufacturer's Software:									
Operating System	2.73	3.83	3.50	2.80	3.48	3.43	3.19	3.11	2.50
Compilers & Assemblers	2.84	2.87	3.53	3.07	3.38	3.50	3.20	2.84	3.72
Applications Programs	3.36	2.44	3.83	3.77	2.99	2.60	2.50	2.50	2.67
Ease of Programming	3.53	3.67	3.99	3.07	3.30	3.83	3.13	3.05	2.98
Ease of Conversion	2.77	3.20	3.67	2.65	3.31	2.83	2.84	3.19	2.31
Overall Satisfaction	3.67	3.67	3.70	3.13	3.46	3.43	3.00	3.05	3.00
Did the system do what you expected it to do? (%)									
Yes	93.33	88.89	90.00	86.67	93.99	100.00	75.00	95.00	80.00
No	0.00	11.11	10.00	6.67	2.73	0.00	6.25	5.00	15.00
Haven't decided	6.67	0.00	0.00	6.67	3.28	0.00	18.75	0.00	5.00
Would you recommend system to another user? (%)									
Yes	66.67	88.89	70.00	93.33	95.08	71.43	87.50	70.00	76.32
No	13.33	11.11	20.00	6.67	1.64	28.57	0.00	10.00	15.79
Haven't decided	20.00	0.00	10.00	0.00	3.28	0.00	12.50	20.00	7.89

Survey Item \ Manufacturer and Model	IBM System/23	IBM 5120	IBM 5280	IBM System/3	IBM System/32	IBM System/34	IBM System/38	MAI/Basic Four All Models	Microdata Reality
No. of User Responses	15	8	8	89	13	426	183	34	20
No. of Systems Represented	26	12	12	92	14	482	191	49	34
Avg. Life of System (Mos.)	22.6	40.9	30.4	77.4	47.1	43.5	27.0	42.0	42.6
Plans for system replacement in 1983 (%)									
Yes, Same Manufacturer	6.67	0.00	0.00	28.09	23.08	6.62	1.64	14.71	15.00
Yes, Vendor Unknown	0.00	25.00	12.50	6.74	15.38	3.05	0.55	0.00	0.00
Yes, Different vendor	6.67	0.00	0.00	6.74	0.00	1.64	0.00	14.71	5.00
No	86.67	75.00	87.50	58.43	61.54	88.68	97.81	70.59	80.00
Significant Advantages (%)									
Users are happy with response time	53.33	12.50	37.50	51.69	23.08	67.04	63.39	55.88	65.00
System is easy to expand/reconfigure	66.67	12.50	50.00	24.72	15.38	75.12	94.16	50.00	75.00
System costs were less than expected	33.33	37.50	0.00	16.85	23.08	16.33	14.21	14.71	20.00
Programs/data carried over from other systems are compatible, as vendor promised	20.00	12.50	25.00	26.97	30.77	30.75	34.43	26.47	40.00
Terminals/periph. carried over from other systems are compatible, as vendor promised	0.00	0.00	25.00	16.85	0.00	7.75	30.78	26.47	35.00
System is power/energy efficient	13.33	25.00	12.50	10.11	7.69	31.83	20.60	26.47	10.00
Productivity aids help us keep programming costs down	46.67	12.50	25.00	16.85	15.38	46.54	61.67	11.76	50.00
Data base language is efficient and effective	13.33	0.00	0.00	4.49	7.69	2.82	50.33	17.65	100.00
Delivery and/or installation of equipment was ahead of schedule	33.33	12.50	0.00	6.74	7.69	16.01	21.31	23.53	15.00
Delivery of required software was ahead of schedule	20.00	25.00	0.00	5.62	7.69	10.33	16.39	17.65	10.00
Significant Problems (%)									
Computer proposed by vendor was too small	0.00	25.00	12.50	5.62	23.08	7.75	16.03	5.88	15.00
Installation of equipment was late	6.67	0.00	0.00	0.00	7.69	1.64	6.56	5.88	0.00
Delivery of required software was late	26.67	0.00	12.50	0.00	7.69	3.05	6.46	2.94	5.00
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	6.67	0.00	0.00	5.95	0.00	5.40	6.28	17.65	25.00
Vendor did not provide all the promised software or support	6.67	0.00	12.50	2.25	0.00	6.57	7.65	11.76	20.00
Program/data compatibil. not what vendor promised	13.33	0.00	0.00	0.00	7.69	2.58	6.20	2.94	0.00
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	0.00	0.00	0.00	0.94	1.09	2.94	10.00
Vendor enhancements/changes to hardware/software hard to keep up with	0.00	12.50	0.00	2.25	7.69	7.26	8.20	17.65	5.00
Equipment is excessively noisy	13.33	12.50	0.00	20.22	0.00	0.70	2.73	5.88	5.00
Power and/or cooling requirements are excessive	0.00	0.00	0.00	12.36	0.00	0.94	1.09	5.88	0.00
System Ratings (4.0-1.0)									
Ease of Operation	3.67	3.38	3.00	3.22	3.31	3.65	3.48	3.65	3.85
Reliability of Mainframe	3.65	3.63	3.75	3.61	3.92	3.61	3.78	3.53	3.65
Reliability of Peripherals	3.46	3.50	3.38	3.32	3.70	3.58	3.61	3.23	3.37
Maintenance Service:									
Responsiveness	3.64	3.67	3.50	3.33	3.62	3.48	3.54	3.21	3.20
Effectiveness	3.36	3.67	3.50	3.29	3.64	3.49	3.53	3.18	3.30
Technical Support:									
Trouble-shooting	3.16	2.00	2.75	2.88	2.77	3.00	3.37	2.65	2.85
Education	2.85	2.83	2.75	2.61	2.62	2.86	2.80	2.43	2.80
Documentation	3.47	3.67	2.75	2.84	2.92	3.02	3.08	2.26	2.75
Manufacturer's Software:									
Operating System	3.27	3.43	2.57	3.24	3.42	3.45	3.42	3.38	4.00
Compilers & Assemblers	3.08	3.50	2.28	3.33	3.46	3.48	3.46	3.18	3.89
Applications Programs	3.18	3.00	2.50	2.93	3.18	3.67	2.86	2.83	3.16
Ease of Programming	3.67	3.12	3.00	3.02	3.44	3.51	3.84	3.56	3.85
Ease of Conversion	2.77	3.00	3.20	2.85	3.10	3.01	2.85	3.93	3.50
Overall Satisfaction	3.40	3.67	3.13	3.16	3.46	3.43	3.43	3.18	3.85
Did the system do what you expected it to do? (%)									
Yes	93.33	100.00	87.50	96.59	84.62	94.59	96.40	91.18	90.00
No	0.00	0.00	0.00	2.27	0.00	1.41	1.65	8.82	5.00
Haven't decided	6.67	0.00	12.50	1.14	15.38	4.00	1.94	0.00	5.00
Would you recommend system to another user? (%)									
Yes	93.33	62.50	87.50	65.91	76.92	95.54	92.82	79.41	85.00
No	0.00	25.00	0.00	32.95	15.38	1.17	0.55	20.59	15.00
Haven't decided	6.67	12.50	12.50	1.14	7.69	3.29	6.63	0.00	0.00

. . . And Their Small Business Systems

Survey Item / Manufacturer and Model	Modcomp All Models	NCR I8000	NCR I9000	NCR 8200 & 8300	Perkin-Elmer 3200	Point 4 All Models	Prime 300, 400, & 500	Prime 50 Series	Qantel All Models
No. of User Responses	5	13	21	9	11	11	10	82	11
No. of Systems Represented	10	20	21	9	11	21	10	88	15
Avg. Life of System (Mos.)	48.5	56.7	24.3	48.2	33.6	41.1	61.6	51.0	29.7
Plans for system replacement in 1983 (%)									
Yes. Same Manufacturer	0.00	20.00	4.76	22.22	9.09	0.00	20.00	1.22	18.18
Yes. Vendor Unknown	0.00	0.00	0.00	0.00	0.00	9.09	0.00	1.22	0.00
Yes. Different vendor	0.00	6.67	0.00	11.11	0.00	0.00	0.00	1.22	0.00
No	100.00	72.33	95.24	66.67	90.91	90.91	70.00	96.34	81.82
Significant Advantages (%)									
Users are happy with response time	40.00	43.75	90.48	88.89	63.64	63.64	50.00	57.32	63.64
System is easy to expand/reconfigure	20.00	62.50	85.71	88.89	72.73	81.82	90.00	82.93	81.82
System costs were less than expected	0.00	12.50	28.57	11.11	27.27	45.45	20.00	15.85	45.45
Programs/data carried over from other systems are compatible, as vendor promised	0.00	18.75	61.90	33.33	54.55	18.18	20.00	36.59	72.73
Terminals/periph. carried over from other systems are compatible, as vendor promised	0.00	31.25	47.62	11.11	36.36	54.55	40.00	21.71	45.45
System is power/energy efficient	20.00	18.75	42.86	33.33	27.27	27.27	10.00	24.39	45.45
Productivity aids help us keep programming costs down	20.00	6.25	42.86	33.33	9.09	37.27	20.00	41.46	36.36
Data base language is efficient and effective	0.00	12.50	19.05	11.11	18.18	36.36	40.00	31.71	45.45
Delivery and/or installation of equipment was ahead of schedule	0.00	6.25	28.57	11.11	18.18	45.45	10.00	31.71	57.27
Delivery of required software was ahead of schedule	0.00	6.25	28.51	0.00	9.09	27.27	10.00	19.51	27.27
Significant Problems (%)									
Computer proposed by vendor was too small	0.00	0.00	0.00	22.22	0.00	9.09	10.00	10.98	18.18
Installation of equipment was late	0.00	0.00	0.00	22.22	18.18	0.00	0.00	8.54	0.00
Delivery of required software was late	0.00	6.25	0.00	22.22	18.18	18.18	10.00	6.10	9.09
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	0.00	6.25	14.29	22.22	18.18	9.09	10.00	9.76	36.36
Vendor did not provide all the promised software or support	20.00	0.00	9.52	22.22	18.18	27.27	10.00	15.85	9.09
Program/data compatibil. not what vendor promised	0.00	0.00	0.00	0.00	0.00	9.09	0.00	7.32	9.09
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	4.76	0.00	0.00	0.00	0.00	1.22	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	0.00	18.75	0.00	11.11	27.27	0.00	10.00	6.10	18.18
Equipment is excessively noisy	0.00	3.25	4.76	11.11	27.27	9.09	0.00	3.66	0.00
Power and/or cooling requirements are excessive	40.00	6.25	0.00	11.11	0.00	0.00	0.00	2.68	0.00
System Ratings (4.0-1.0)									
Ease of Operation	3.00	3.50	2.70	2.88	2.31	3.46	2.80	2.58	3.73
Reliability of Mainframe	3.00	3.15	3.62	3.44	3.72	3.64	2.80	3.67	3.82
Reliability of Peripherals	2.80	3.13	2.48	3.11	3.15	3.15	2.80	3.27	2.46
Maintenance Service:									
Responsiveness	3.25	2.31	3.52	3.00	2.64	3.20	3.00	3.21	3.56
Effectiveness	3.00	2.75	2.14	3.00	2.80	2.89	2.89	3.03	2.18
Technical Support:									
Trouble-shooting	2.57	2.65	2.90	2.33	2.09	2.73	2.90	2.70	2.31
Education	3.00	2.63	2.64	2.75	2.00	2.36	2.88	2.73	2.73
Documentation	2.67	2.44	2.90	3.00	2.27	2.36	2.80	2.67	2.90
Manufacturer's Software:									
Operating System	3.00	2.88	2.43	3.33	2.90	3.65	3.60	3.42	3.27
Compilers & Assemblers	2.80	3.15	2.20	2.33	2.50	3.88	3.20	3.06	3.60
Applications Programs	3.00	2.64	2.64	2.67	2.40	2.88	3.00	2.88	2.90
Ease of Programming	2.67	2.00	3.40	3.33	3.09	3.09	2.40	3.88	3.46
Ease of Conversion	2.00	2.73	2.43	3.28	3.30	2.70	2.10	3.15	3.20
Overall Satisfaction	2.20	3.19	3.43	3.44	3.09	3.27	3.60	3.32	2.45
Did the system do what you expected it to do? (%)									
Yes	100.00	81.25	100.00	88.89	62.64	72.73	100.00	84.15	81.83
No	0.00	0.00	0.00	11.11	18.18	9.09	0.00	7.22	0.00
Haven't decided	0.00	18.75	0.00	0.00	18.18	18.18	0.00	3.54	18.18
Would you recommend system to another user? (%)									
Yes	40.00	68.57	100.00	88.89	72.73	72.73	90.00	86.59	81.82
No	60.00	12.22	0.00	11.11	18.18	9.09	10.00	7.32	9.09
Haven't decided	0.00	20.00	0.00	0.00	9.09	18.18	0.00	6.10	9.09

Survey Item / Manufacturer and Model	Tandem All Models	Texas Instruments 990	Wang VS	Wang 2200	Minicomputers (Other Models)				
No. of User Responses	19	40	71	36	109				
No. of Systems Represented	67	88	88	48	161				
Avg. Life of System (Mos.)	31.6	88.4	33.6	43.3	80.8				
Plans for system replacement in 1982 (%)									
Yes. Same Manufacturer	26.32	0.00	4.23	5.56	6.74				
Yes. Vendor Unknown	0.00	2.55	0.00	0.00	6.71				
Yes. Different vendor	0.00	6.12	1.41	2.78	6.71				
No	73.68	92.21	94.37	91.67	71.84				
Significant Advantages (%)									
Users are happy with response time	47.37	65.00	74.65	75.00	66.13				
System is easy to expand/reconfigure	89.47	65.00	83.10	75.00	66.09				
System costs were less than expected	0.00	25.00	14.08	16.67	24.76				
Programs/data carried over from other systems are compatible, as vendor promised	5.26	20.00	25.35	13.87	33.33				
Terminals/periph. carried over from other systems are compatible, as vendor promised	5.26	17.50	2.82	0.00	24.67				
System is power/energy efficient	15.79	17.50	33.80	12.50	23.81				
Productivity aids help us keep programming costs down	63.16	22.50	77.46	36.11	26.71				
Data base language is efficient and effective	36.84	5.00	12.68	25.00	31.43				
Delivery and/or installation of equipment was ahead of schedule	36.84	90.00	5.63	19.44	22.86				
Delivery of required software was ahead of schedule	21.05	5.00	7.04	13.89	10.48				
Significant Problems (%)									
Computer proposed by vendor was too small	21.05	17.50	8.45	12.55	5.57				
Installation of equipment was late	0.00	10.00	5.63	13.89	11.43				
Delivery of required software was late	0.00	12.50	12.68	16.67	18.10				
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	26.22	10.00	11.27	13.89	5.57				
Vendor did not provide all the promised software or support	5.26	20.00	5.63	25.00	15.10				
Program/data compatibil. not what vendor promised	10.53	5.00	4.23	2.78	6.67				
Terminals/peripherals compatibility not what vendor promised	0.00	5.00	2.82	0.00	2.86				
Vendor enhancements/changes to hardware/software hard to keep up with	10.53	5.00	12.68	16.67	14.29				
Equipment is excessively noisy	0.00	5.00	5.63	13.89	10.48				
Power and/or cooling requirements are excessive	0.00	2.50	4.22	2.78	8.57				
System Ratings (4.0-1.0)									
Ease of Operation	3.47	3.44	3.76	3.72	3.48				
Reliability of Mainframe	3.79	3.50	2.61	3.78	3.49				
Reliability of Peripherals	3.21	3.27	3.10	3.44	3.12				
Maintenance Service:									
Responsiveness	3.47	3.09	3.14	3.86	3.24				
Effectiveness	3.00	3.13	3.09	3.13	3.12				
Technical Support:									
Trouble-shooting	3.21	2.90	2.78	2.86	2.87				
Education	3.06	2.76	2.90	3.56	2.86				
Documentation	3.00	2.83	2.43	2.67	2.82				
Manufacturer's Software:									
Operating System	3.37	3.21	3.47	3.32	3.19				
Compilers & Assemblers	3.11	3.23	3.64	3.37	3.09				
Applications Programs	3.06	3.04	3.09	2.75	2.85				
Ease of Programming	3.37	3.24	3.71	3.47	3.21				
Ease of Conversion	2.51	3.24	3.22	2.74	2.86				
Overall Satisfaction	3.53	3.35	3.39	3.28	3.13				
Did the system do what you expected it to do? (%)									
Yes	89.47	87.15	88.72	86.11	85.71				
No	0.00	0.00	4.22	2.73	7.62				
Haven't decided	10.53	12.82	7.04	11.11	6.67				
Would you recommend system to another user? (%)									
Yes	89.47	92.50	88.37	86.11	73.88				
No	0.00	0.00	4.29	5.56	17.14				
Haven't decided	10.53	7.50	7.14	8.33	10.48				

Users Rate the Vendors of Their Minis . . .

Survey Item \ Manufacturer and Model	Alpha Micro	Altos	Burroughs	Data General	Datapoint	Digital Equipment	Four-Phase	General Automation
No. of User Responses	16	16	139	93	61	330	33	6
No. of Systems Represented	31	16	142	116	143	489	46	6
Avg. Life of System (Mos.)	34.9	16.6	39.6	43.7	41.6	41.6	40.4	55.7
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	18.75	14.29	8.45	10.87	3.33	10.37	18.18	0.00
Yes, Vendor Unknown	0.00	7.14	3.16	2.17	1.67	2.74	0.00	16.67
Yes, Different vendor	0.00	0.00	3.94	6.52	3.33	2.44	21.21	33.33
No	81.25	78.57	83.46	80.43	91.67	84.45	60.61	50.00
Significant Advantages (%)								
Users are happy with response time	86.67	86.67	48.22	61.61	69.74	66.39	48.48	33.33
System is easy to expand/reconfigure	86.67	86.67	67.16	55.81	61.50	66.67	39.39	0.00
System costs were less than expected	46.67	46.67	14.64	6.50	24.69	14.24	6.06	16.67
Programs/data carried over from other systems are compatible, as vendor promised	46.67	46.67	50.75	33.33	39.34	28.36	12.12	16.67
Terminals/peripherals carried over from other systems are compatible, as vendor promised	40.00	40.00	38.64	16.39	32.79	28.48	6.06	0.00
System is power/energy efficient	60.00	60.00	27.34	13.98	21.31	18.18	18.18	0.00
Productivity aids help us keep programming costs down	33.33	33.33	38.64	24.73	22.95	29.09	18.18	0.00
Data base language is efficient and effective	40.00	40.00	38.28	10.78	22.95	11.82	12.12	16.67
Delivery and/or installation of equipment was ahead of schedule	40.00	40.00	14.84	13.98	24.59	10.61	15.15	0.00
Delivery of required software was ahead of schedule	33.33	33.33	7.81	11.83	8.84	6.67	9.09	0.00
Significant Problems (%)								
Computer proposed by vendor was too small	0.00	0.00	7.03	15.05	6.56	10.61	6.06	16.67
Installation of equipment was late	0.00	0.00	27.34	10.75	13.11	13.64	27.27	0.00
Delivery of required software was late	0.00	0.00	11.72	18.35	14.75	12.73	18.18	0.00
System costs (for hardware, vendor supplied software, support) exceeded the expected total	0.00	0.00	9.38	16.09	8.20	14.55	12.12	0.00
Vendor did not provide all the promised software or support	6.25	0.00	14.06	33.66	16.39	10.00	21.21	33.23
Program/data compatibility not what vendor promised	0.00	0.00	3.12	6.45	4.92	2.42	12.12	0.00
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	2.34	2.15	0.00	0.61	3.03	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	12.50	6.67	14.06	13.98	27.87	11.82	12.12	32.22
Equipment is excessively noisy	6.25	6.67	7.03	6.45	8.20	10.00	0.00	16.67
Power and/or cooling requirements are excessive	6.25	0.00	1.56	6.38	0.00	6.45	0.00	0.00
System Ratings (4.0-1.0)								
Ease of Operation	3.75	3.53	3.50	3.20	3.49	3.46	3.09	2.33
Reliability of Mainframe	3.68	2.87	3.40	3.01	2.98	3.50	3.16	2.33
Reliability of Peripherals	3.68	3.53	2.96	3.17	3.28	3.27	3.00	2.50
Maintenance Service								
Responsiveness	3.27	2.82	3.12	3.33	3.64	3.33	3.09	2.83
Effectiveness	3.38	2.82	2.82	3.18	3.30	3.20	2.86	2.83
Technical Support								
Trouble-shooting	3.09	3.00	2.81	2.74	2.98	2.67	2.42	1.50
Education	2.71	2.83	2.62	2.62	2.86	2.81	2.34	1.33
Documentation	3.13	2.68	2.18	2.32	2.86	2.86	2.81	1.17
Manufacturer's Software								
Operating System	3.81	3.40	3.87	2.87	3.43	3.37	2.62	2.00
Compilers & Assemblers	3.63	3.33	3.26	2.86	3.38	3.26	2.89	2.00
Applications Programs	3.83	3.27	2.68	2.68	3.13	3.06	2.61	2.00
Ease of Programming	3.68	3.36	3.21	2.86	3.48	3.27	2.78	2.17
Ease of Conversion	3.43	3.31	3.16	2.71	3.04	2.86	2.67	1.80
Overall Satisfaction	3.83	3.53	3.16	3.07	3.43	3.33	2.78	2.17
Did the system do what you expected it to do? (%)								
Yes	100.00	100.00	91.27	84.27	93.44	86.97	84.38	33.32
No	0.00	0.00	5.56	12.36	3.28	5.45	12.50	33.33
Haven't decided	0.00	0.00	3.17	3.37	3.28	7.58	3.13	33.33
Would you recommend system to another user? (%)								
Yes	100.00	100.00	76.38	79.02	93.44	83.69	72.73	16.67
No	0.00	0.00	11.02	15.38	4.92	6.17	18.18	66.67
Haven't decided	0.00	0.00	12.60	6.60	1.64	10.61	9.09	16.67

Survey Item \ Manufacturer and Model	Harris	Hewlett-Packard	Honeywell	IBM	Microdata	MAI/Basic Four	Modcomp	NCR
No. of User Responses	15	224	36	762	34	20	5	46
No. of Systems Represented	30	308	86	877	40	24	10	50
Avg. Life of System (Mos.)	42.8	37.8	38.0	43.2	47.0	42.0	46.8	38.8
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	6.67	12.16	5.56	8.90	14.71	15.00	0.00	13.33
Yes, Vendor Unknown	0.00	0.90	0.00	3.45	0.00	0.00	0.00	0.00
Yes, Different vendor	20.00	1.35	2.78	2.56	14.71	5.00	0.00	4.44
No	73.73	85.59	91.67	84.40	70.59	80.00	100.00	82.22
Significant Advantages (%)								
Users are happy with response time	50.00	66.36	80.00	58.86	58.86	60.00	40.00	66.67
System is easy to expand/reconfigure	46.67	50.50	86.11	68.63	50.00	70.00	20.00	76.26
System costs were less than expected	33.33	12.50	8.33	13.30	14.71	20.00	0.00	16.67
Programs/data carried over from other systems are compatible, as vendor promised	0.00	30.50	22.22	26.67	26.47	40.00	0.00	41.30
Terminals/peripherals carried over from other systems are compatible, as vendor promised	6.67	19.19	13.89	13.30	26.47	30.00	0.00	34.78
System is power/energy efficient	6.67	28.68	19.44	22.83	26.47	10.00	20.00	32.61
Productivity aids help us keep programming costs down	6.67	43.76	16.67	48.47	11.76	60.00	20.00	28.26
Data base language is efficient and effective	6.67	70.85	19.44	21.99	17.65	100.00	0.00	19.22
Delivery and/or installation of equipment was ahead of schedule	6.67	20.94	11.11	17.60	23.53	15.00	0.00	17.39
Delivery of required software was ahead of schedule	6.67	12.06	11.11	11.29	17.65	10.00	0.00	13.04
Significant Problems (%)								
Computer proposed by vendor was too small	6.67	6.25	11.11	10.49	5.88	15.00	0.00	4.35
Installation of equipment was late	13.33	8.04	16.67	3.71	5.88	0.00	0.00	4.35
Delivery of required software was late	13.33	6.25	16.67	4.50	2.94	5.00	0.00	6.52
System costs (for hardware, vendor supplied software, support) exceeded the expected total	6.67	10.27	11.11	7.18	17.65	25.00	0.00	12.04
Vendor did not provide all the promised software or support	40.00	6.25	25.00	6.81	11.76	20.00	20.00	8.70
Program/data compatibility not what vendor promised	6.67	4.02	8.33	4.35	2.94	0.00	0.00	0.00
Terminals/peripherals compatibility not what vendor promised	13.33	2.68	8.33	1.25	2.94	10.00	0.00	2.17
Vendor enhancements/changes to hardware/software hard to keep up with	20.00	6.45	16.67	7.16	17.65	5.00	0.00	8.70
Equipment is excessively noisy	6.67	3.57	11.11	3.71	8.88	0.00	0.00	6.52
Power and/or cooling requirements are excessive	6.67	1.79	11.11	2.17	5.52	0.00	40.00	4.35
System Ratings (4.0-1.0)								
Ease of Operation	3.40	3.69	3.33	3.52	2.86	3.86	3.00	3.50
Reliability of Mainframe	3.00	3.78	3.42	3.77	3.53	3.66	3.00	3.43
Reliability of Peripherals	2.67	3.69	3.28	3.50	3.33	3.37	2.50	3.28
Maintenance Service								
Responsiveness	2.62	3.38	3.22	3.48	3.21	3.20	3.25	3.17
Effectiveness	2.72	3.47	3.08	3.40	3.18	3.20	3.00	2.98
Technical Support								
Trouble-shooting	2.83	3.09	3.75	2.97	2.86	3.06	2.67	2.71
Education	2.40	2.07	2.81	2.92	2.42	2.89	3.00	2.78
Documentation	2.07	2.83	2.53	3.00	2.28	2.78	2.67	2.71
Manufacturer's Software								
Operating System	2.73	3.44	3.14	3.38	3.28	4.00	3.00	3.22
Compilers & Assemblers	2.64	3.34	3.09	3.28	3.18	3.66	2.50	3.22
Applications Programs	2.38	2.86	2.86	2.80	2.83	3.16	3.00	2.74
Ease of Programming	2.83	3.34	3.10	3.33	3.56	3.66	2.67	3.24
Ease of Conversion	2.77	3.17	2.83	2.83	2.93	3.66	2.00	3.14
Overall Satisfaction	2.67	3.46	3.03	3.38	3.18	3.86	2.20	3.36
Did the system do what you expected it to do? (%)								
Yes	93.33	93.30	86.11	92.42	91.18	90.00	100.00	91.30
No	0.00	3.57	5.56	2.18	8.82	5.00	0.00	2.17
Haven't decided	6.67	3.13	8.33	5.40	0.00	5.00	0.00	6.52
Would you recommend system to another user? (%)								
Yes	86.67	92.86	77.78	89.72	79.41	85.00	40.00	86.67
No	13.33	4.02	5.56	5.81	20.59	15.00	60.00	6.67
Haven't decided	20.00	3.13	16.67	4.37	0.00	0.00	0.00	6.67

. . . And Small Business Systems

Survey Item / Manufacturer and Model	Perkin-Elmer	Point 4	Prime	Qantel	Tandem	Texas Instruments	Wang	Other Minicomputers
No. of User Responses	11	11	92	11	19	40	107	105
No. of Systems Represented	11	81	109	16	87	96	129	161
Avg. Life of System (Mos.)	32.8	41.1	33.3	29.7	31.6	36.4	37.0	30.6
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	9.09	0.00	4.35	18.18	26.32	0.00	4.67	8.74
Yes, Vendor Unknown	0.00	9.09	1.09	0.00	0.00	2.56	0.00	6.71
Yes, Different vendor	0.00	0.00	1.09	0.00	0.00	5.13	1.87	6.71
No	90.91	90.91	93.48	81.82	73.68	92.31	93.46	77.84
Significant Advantages (%)								
Users are happy with response time	63.64	54.55	59.78	63.64	47.37	65.00	74.77	58.10
System is easy to expand/reconfigure	72.73	81.82	83.70	81.82	68.42	85.00	80.37	56.19
System costs were less than expected	27.27	45.45	18.48	45.45	0.00	30.00	14.95	24.76
Programs/data carried over from other systems are compatible, as vendor promised	54.55	18.18	35.87	72.73	5.26	20.00	22.43	33.33
Terminals/peripherals carried over from other systems are compatible, as vendor promised	36.36	54.55	32.61	45.45	5.26	17.50	1.87	26.67
System is power/energy efficient	27.27	27.27	22.83	45.45	15.79	17.50	20.56	22.86
Productivity aids help us keep programming costs down	9.09	27.27	36.96	36.36	63.16	22.50	52.34	25.71
Data base language is efficient and effective	18.18	36.36	32.61	45.45	36.84	5.00	16.82	31.43
Delivery and/or installation of equipment was ahead of schedule	18.18	45.45	30.43	27.27	36.84	20.00	13.08	22.86
Delivery of required software was ahead of schedule	9.09	27.27	16.30	27.27	21.05	5.00	8.41	10.48
Significant Problems (%)								
Computer proposed by vendor was too small	0.00	9.09	10.87	18.18	21.05	17.50	10.28	6.67
Installation of equipment was late	18.18	0.00	7.61	0.00	0.00	10.00	11.21	11.43
Delivery of required software was late	18.18	18.18	6.52	9.09	0.00	12.50	14.02	18.10
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	18.18	9.09	8.70	36.36	26.32	10.00	18.69	6.67
Vendor did not provide all the promised software or support	18.18	27.27	16.30	9.09	5.26	20.00	14.02	18.10
Program/data compatibility not what vendor promised	0.00	9.09	8.70	9.09	10.53	5.00	3.74	6.67
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	1.09	0.00	0.00	5.00	1.87	5.71
Vendor enhancements/changes to hardware/software hard to keep up with	27.27	0.00	6.52	18.18	10.53	5.00	14.02	14.29
Equipment is excessively noisy	27.27	9.09	3.26	0.00	0.00	5.00	8.41	10.48
Power and/or cooling requirements are excessive	0.00	0.00	3.26	0.00	0.00	2.50	3.74	6.67
System Ratings (4.0-1.0)								
Ease of Operation	3.61	3.45	3.56	3.73	2.47	3.44	3.77	3.48
Reliability of Mainframe	3.73	3.64	3.66	3.82	3.79	3.50	3.67	3.48
Reliability of Peripherals	3.18	3.18	3.22	3.45	3.21	3.37	3.31	2.12
Maintenance Service:								
Responsiveness	2.64	3.30	3.38	3.60	3.47	3.06	3.18	3.24
Effectiveness	2.80	3.09	3.01	3.18	3.00	3.13	3.07	3.16
Technical Support:								
Trouble-shooting	3.00	2.73	2.89	2.91	3.21	3.00	3.01	3.07
Education	2.00	2.36	2.74	2.73	3.08	2.76	2.52	2.86
Documentation	2.27	2.36	2.87	2.80	3.00	2.82	2.90	2.82
Manufacturer's Software:								
Operating System	2.90	3.36	3.44	3.27	3.37	3.21	3.43	3.18
Compilers & Assemblers	2.90	3.30	3.09	2.30	3.11	3.23	2.51	2.09
Applications Programs	2.40	3.00	2.89	2.90	3.06	3.04	3.00	2.86
Ease of Programming	3.00	3.00	3.30	3.45	3.37	3.24	3.04	3.21
Ease of Conversion	2.90	2.70	3.16	3.20	2.61	3.24	3.06	2.86
Overall Satisfaction	3.09	3.27	3.24	3.45	3.53	3.25	3.34	3.13
Did the system do what you expected it to do? (%)								
Yes	63.64	72.73	85.87	81.82	89.47	87.18	87.85	85.71
No	18.18	9.09	6.52	0.00	0.00	0.00	5.61	7.62
Haven't decided	18.18	18.18	7.61	18.18	10.53	12.82	6.54	6.67
Would you recommend system to another user? (%)								
Yes	72.73	72.73	86.96	81.82	89.47	92.50	87.74	72.38
No	18.18	9.09	7.61	9.09	0.00	0.00	4.72	17.14
Haven't decided	9.09	18.18	5.43	9.09	10.53	7.50	7.55	10.48

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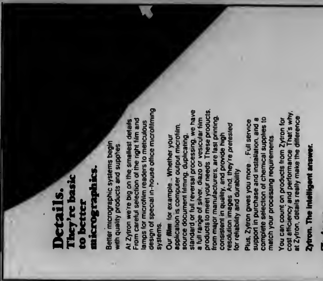


EDITORIAL

Regaining Respectability

Well, at least it wasn't Houston.

In almost all ways, the National Computer Conference last week in Anaheim, Calif., was a totally different show from the same event a year ago. Chiefly, it was a difference in intention.

NCC '83, in fact, may be remembered as a vintage year, flanked by an appalling NCC '82 in Houston and a still uncertain NCC '84 in mid-July in Las Vegas. As with fine wine, the optimum location, climate and facilities had much to do with the success of this year's product.

But there were other, more significant differences. Clearly, NCC has become a business information show emphasizing not the individual elements of computing, but their integration and business application. Information is the hard currency of business, and nowhere were the systems that manipulate, process and distribute that information more visible than on the floor of the convention center. This feeling of an industry moving forward in sync was missing from Houston last year.

Microcomputers from all major manufacturers were scattered around the floor, but they did not steal the collective thunder as they did in Houston. In fact, the new product introduction spotlight this year was on large system announcements from NCR and IBM — the first time IBM has used NCC as a platform for a new product announcement.

The selection of John P. Imlay Jr., chairman and chief executive officer of Management Science America and a leading spokesman for the software and services industry, to keynote the conference this year was another difference. It translated into appropriate recognition of the vital importance of software in the future of integrated computing.

Both American Federation of Information Processing Societies, Inc. show management and the management of the Anaheim Convention Center deserve high praise for one of the most well-coordinated conferences in recent memory. NCC has regained the respectability it lost in the circus-like atmosphere a year ago. It is a highly professional trade show again.

DATA PAST

Five Years Ago
May 22, 1978

LAS VEGAS — Integrated business communications using satellite links came a step closer to everyday reality with the introduction here of the Office of the Future Controller by American Satellite Corp.

The device was among almost a dozen products introduced at the International Communications Association's annual meeting.

The controller was said to allow a company to utilize a full-duplex 56K bit/sec satellite channel for digital voice and teleconferencing.

— — —

NEW YORK — Modular expandability and throughput said to be as much as twice that of fBM's medium-scale systems highlighted a family of 360-, 370- and Series 30-compatible central processors introduced by Magnuson Systems Corp.

Ten Years Ago
May 23, 1973

WALTHAM, Mass. — Honeywell, Inc. added a new computer to the low end of its Series 6000.

The Model 6025 was designed for H400 and large H200 users who wanted to upgrade to multijob streams, time-sharing and network processing.

Competitively, the 6025 was designed as an alternative to IBM's 370/135 and 370/f45 and Burroughs Corp.'s B-4700.

— — —

BOSTON — AT&T chose the annual conference of the International Communications Association to introduce its Dataspeed 40 CRT terminal.

The Bell display unit was one of the equipment announcements by several suppliers at the communications users' show.

RFI
DP SYSTEMS
ESPIONAGE
VULNERABILITY
DP
MGR
$
PROTECTIVE MEASURES COST
Computerworld

Reality or Fantasy?

LETTERS

Superficial Assessments

I thought the article "DPers' No. 1 Headache? Applications Backlog" [CW, April f1] contained some superficial assessments of DP problems by some managers.

If the applications backlog is caused by excessive maintenance and other factors, as suggested in the article by consultant Mark Eppley from Peat, Marwick, Mitchell & Co., then the backlog is not the problem — it is a symptom.

Perhaps this lack of understanding will affect the ability of said managers to generate solutions relevant to their problems.

Katherine Marling
Salem, Ore.

Invest in the Training

On the basis of the article "Dvorak Keyboard Plays Blues for Author" [CW, May 2], it appears that Dave Horton presumed that he would have no trouble picking up the Dvorak Simplified Keyboard (DSK) with only minimal drill, he became frustrated when it didn't come easily and wrote an article that deprecates DSK in general because he was unable to make it work for him.

I would be interested in an article by someone with the competence to use both DSK and the Qwerty keyboard, someone who is in a position to give objective timing estimates.

Horton's article impresses me as being somewhat unprofessional. I wonder whether he would insist that his clients — who might, after all, be willing to invest in the training that Horton was unwilling to acquire — deny themselves the benefits of a significant improvement in human engineering because he had trouble with DSK.

I haven't had the time to learn DSK. In spite of what I consider to be a handicap (since typing on DSK is reported to be faster and less tiring), I still think DSK (and other human-engineered keyboards, such as the Malton keyboard) will, in the long run, replace Qwerty.

I seem to recall a famous physicist observing that major advances in physics were made by young physicists who outlive old physicists. Perhaps that principle applies to advances in general?

Peter Zilahy Ingerman
Systems Consultant
Willingboro, N.J.

Proper Use for Usefulness

I was disappointed with Dave Horton's article "Dvorak Keyboard Plays Blues for Author" [CW, May 2].

First, Horton readily admits that his keyboarding speed is poor after 15 years of practice.

Given the fact that his keyboarding speed is poor, did he really expect to become an expert on a different keyboard after only a few hours of practice spread out over a couple of weeks?

Second, Horton seems to have sabotaged his own learning environment. Why did he use a keyboard where the incorrect arrangement was showing?

From my own experimenting, I found that it is extremely confusing to use a keyboard in which the key caps do not match the arrangement.

Having both the Qwerty and the Dvorak keys shown could only have interfered.

The Dvorak keyboard is like any other tool: It must be used properly to be useful.

"Used properly" does not mean a half-hearted attempt in an environment that is poorly human-engineered.

David T. Wolff
Framingham, Mass.

SOFTLINE/Werner L. Frank‡

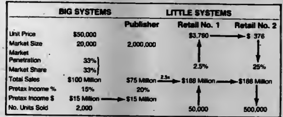
Software Economics: An Exercise in Pricing

Two very different types of software markets have now emerged. One consists of the traditional direct sales of software intended for large computer systems. The second is the larger market based on microcomputers, for which elaborate and multitiered distribution systems are developing. We will consider both markets in exploring the underlying economics that relate product pricing to market size and penetration.

Our reference point is the economic model under the heading "Big Systems" (see chart above). The software product under analysis here will command $50,000 per unit in a total market size of 20,000 possible clients. Both price and market size are typical of many popular software products available for IBM mainframe installations.

Software designed for general-purpose usage on large equipment may easily be capable of a 33% market penetration. Some popular software, such as sorts, data base management and teleprocessing, have even higher penetration.

The top one or two offerings in any one particular category would be able to capture at least one-third of the penetrated market. So for the case at hand, it could be presumed that the product being analyzed might well achieve a sales level of at least 10% of the market, or 2,000 units, generating $100 million in sales. At such a level, the vendor can achieve a 15%, or $15 million, pretax income.



	BIG SYSTEMS	LITTLE SYSTEMS		
		Publisher	Retail No. 1	Retail No. 2
Unit Price	$50,000		$3,760 →	$ 376
Market Size	20,000	2,000,000		
Market Penetration	33%			
Market Share	33%		2.5%	25%
Total Sales	$100 Million	$75 Million → 2.5x	$188 Million →	$188 Million
Pretax Income %	15%	20%		
Pretax Income $	$15 Million →	$15 Million		
No. Units Sold	2,000		50,000	500,000

The New Software Economics

Let us turn to software sales for smaller hardware systems and, using the big system analysis as a guide, examine the comparable economics.

Assume that our hypothetical vendor would like to achieve the very same profit potential of $15 million as in the case already described. Now the vendor has become a software publisher and in that role will demand a somewhat higher pretax income, 20% for example.

With this objective, he will need to generate $75 million worth of "wholesale" sales. We assume a market size of 2,000,000 hardware units capable of operating the software. Including the hardware systems of Apple Computer, Inc., Tandy Corp., Commodore Business Machines, Inc. and IBM, this market size is already nearly a reality.

We now examine two retail situations. First, we note that the markup to retail of the publisher's price is 250%. This 60% point margin over publisher's price is spread between distributor and dealer.

First Retail Case

For the first retail case, we assume that the total number of units of a specific software product sold is 50,000, a sales level already achieved by at least 12 commercially available products. This represents a modest 2.5% participation in the potential market. Examples illustrating such sales levels is generic software available for personal computers that provides a meaningful service, such as word processing, spreadsheet analysis, data management and so on.

The arithmetic for the first retail model easily leads to the conclusion that such software, if it satisfies our assumption of desired profit level, would have to be priced at $3,760 per unit. While there are a few examples today of special-purpose software for microcomputers that do command such prices, on the whole, it is more likely that users will pay only a tenth of this amount. So we begin our calculation for the second retail model by assuming a more realistic unit sales price of $376. The lower price would necessitate the sale of 500,000 units, requiring a market share/penetration of 25%, a substantial, but not unrealistic, goal.

As rare as one might suppose the achievement levels shown in the chart for both big system and microcomputer software, such successes exist at both extremes for at least a few examples. The annual International Computer Programs, Inc. census of software product sales has identified at least two products serving big machines reaching cumulative sales levels above $100 million.

In contrast, at least three products serving the microcomputer have reached sales levels approximating 500,000 units or more. These are Microsoft, Inc.'s Basic, Digital Research, Inc.'s CP/M and Visicorp's Visicalc. While none of these products has actually generated retail sales levels of $188 million, it could be presumed that the respective publishers will have gained cumulative wholesale revenues and profits that are not too far removed from the goal set in the chart. The data shown, therefore, displays the spectrum of performance, with the great majority of products exhibiting economics that range between the indicated extremes.

Frank is an independent consultant and president of the Werner Frank Computer Group located in Calabasas, Calif.

READER COMMENTARY/Richard J. Lennon‡

Unraveling the Meaning of DSS

What is your reaction when someone starts to talk about decision support systems (DSS)? Do you get a queasy feeling in the pit of your stomach? Did you have the same feeling when people talked about management information systems (MIS) back in the mid-'60s? DSS and MIS are like a rare species of bird: You read about them, but have never really seen them.

Back in the mid-'60s, data processing was in full bloom. Applications of early hardware and software to labor-intensive areas resulted in significant gains for many companies by completing accounting, payroll, order entry, production, purchasing and other related applications.

However, when it came time for management to control what was happening or to plan where the company was going, the data was not available. More accurately, it may have been available, but parts of it were in different functional systems and there wasn't any way to link the data together.

Someone, or a number of people, proposed a concept that linked the various operating subsystems in an integrated fashion and provided summary information to aid management decision making at control, coordinative and strategic-planning levels. MIS was an excellent theoretical framework, but it never developed to the point of actually becoming a full-fledged theory.

> *'Decision support functions arose from the same needs of management that spawned MIS. It does not have much history or framework. Currently, it is mostly a separate bunch of pieces grouped together in an abstraction that is given the name "DSS."'*

Reason for Breakdown

The reason for this breakdown was implementation. Developing true MIS for even a small company could take many years of extensive effort. By the time it was complete, most of the users it was intended for would wonder what it was, because they no longer operated the same way.

At a macro level, MIS was the integration of data from operational systems as an information base for management processes. It was a resource for management in the decision process.

From a micro perspective, MIS has never really existed. MIS became a goal when during the design effort there was an attempt to identify and accommodate perceived relationships with other systems and to roll that information upward in some type of management reporting process.

Decision support functions arose from the same needs of management that spawned MIS. It does not have much history or framework. Currently, it is mostly a separate bunch of pieces grouped together in an abstraction that is given the name "DSS."

At a Macro Level

Decision support at a macro level is providing information from various sources to management for use in the decision process. At a micro level, it can be defined as: "The application of computer-aided techniques in the classification, analysis and interpretation of data, collected for a specific decision situation. It enables a decision maker to apply modeling, forecasting, statistics, linear programming, Monte Carlo techniques and so on to various alternatives. The decision maker is then able to estimate reasonably the consequences and probability of a number of alternatives."

A manager might select certain data from a company's investment portfolio and apply certain assumptions to determine the potential yield of certain actions. He is not usually dealing with every record of investment, but with extracted summary level data. This manager is determining what investment strategy would be more lucrative.

He is not developing a new system for processing investments. The potential of end-user programming is linked to DSS only in the sense that some of the high-level facilities that make a DSS user-friendly might also be of use in application development by the end user.

Macro Objectives

It appears that both MIS and DSS have similar, if not identical, macro objectives. DSS, however, attempts to get around the design and implementation difficulties of a total MIS

(Continued on Page 53)

READER COMMENTARY

With the DP Revolution Upon Us, We Need

Very few companies or government agencies today are not totally dependent upon computers. Without computers, the competition would put these companies out of business. More importantly, if a major corporation were to lose the services of its computer resources for any length of time, it quite probably would be out of business.

But the technology in the DP industry is advancing so rapidly, most people are hard-pressed to keep up with all the changes. Management of DP installations has found it virtually impossible to perform any long-term planning due to the constant changes in both hardware and software.

The problem has become so serious that we find now that many installations have leased or purchased fourth-generation hardware and software, but they really don't take advantage of the computing capability because they don't have the personnel trained to operate and support it. And the managers themselves are not properly trained and prepared for it.

Vendor Dependent

Many people in management have put themselves in the position of being vendor dependent. They are so concerned with keeping up with the Joneses that as soon as a vendor announces a new hardware or software product, these people in management feel they must have it because the competition has it or is going to get it.

Once the new hardware and software is installed, the people in management suddenly realize that major programming changes must occur before the work will run. They totally overlook the fact that no one knows how to function in the new environment and that education and training of personnel is needed. As a result, jobs terminate abnormally, and no one knows why.

Before anyone realizes, the entire operation finds itself in a react mode, and a hue and cry for help from the vendors is put out.

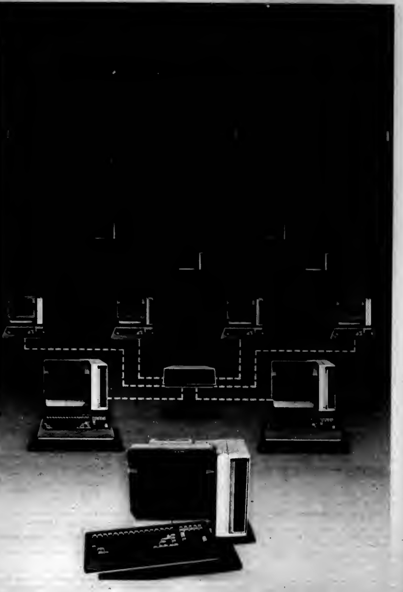
The vendors really don't have in-house applications experience for each user installation. What's more, they shouldn't be expected to.

Vendors are in business to make money from the products they market, and their goal is to market those products to more customers than their competitors. The vendor cannot possibly foresee all problems that may occur because no two users of their products run the same work. Yet when problems do occur, management immediately calls the vendor to solve them.

One of the biggest mistakes management makes today is in the area of proprietary software packages that serve as aids to the operating system. These packages are marketed in most cases by reputable companies, and the packages do work. However, they all require that certain groundwork be laid and people properly trained to operate and support them. This is seldom done.

Management signs a contract (usually a long-term contract), and when the package is installed, management suddenly realizes not only that it is not doing the job it was designed to do, but it is also using up valuable systems resources. As a result, the package is put on the shelf, and the vendor is called. But since the contract has already been signed and the product has been proven to work if properly installed, management has no recourse but to pay for it.

It is frightening to see how many computer installations have state-of-the-art hardware and software but waste countless dollars because they do not understand how to apply it to their



Dan W. Artibee‡

to Ask: 'Who Is Managing Management?'

respective needs.

They continue to operate as they did with second-generation technology and in many cases, rely totally on one or two people who supposedly are technical experts to make their decisions for them.

They take the approach that they are managers, and they only have to know how to handle people. They can hire technicians to handle nonpeople decisions. As a result, we find that many installations are totally dependent on the decision that one or two technical support people make.

Another alarming fact that has become apparent is the wasted dollars due to poor management decisions. Anyone involved in data processing is aware of the hundreds of thousands (more probably millions) of dollars lost every year due to downtime and job failure. This is especially true of on-line and interactive dependent installations. How many people are idled from their jobs each time the systems resources are lost for any length of time?

We are rapidly approaching the stage where if something isn't done soon about the incompetence of management, disaster will strike.

Today's management is afraid of the very things it is paid to manage. Very few people in management have a good understanding of today's technology. They hide in their offices all day and call for time-wasting meetings to prove to themselves that they are in charge.

Operations Area

Management today refuses to accept that the operations area is rapidly progressing technologically and it fails to provide the proper training and staffing that is necessary.

A computer operator responsible for an IBM 3081 can cause much more damage and loss of dollars than an applications programmer who improperly codes a program and causes it to fail. Yet the salary comparison between the two is staggering.

Most proprietary software packages available on the

(Continued on Page 53)

READER COMMENTARY/Peter F. Klammer‡

Personal Computers vs. Personal Computing

In the wake of the microcomputer revolution, both users and providers of DP services have been left with a crippling confusion between the terms "personal computer" and "personal computing."

"Personal computer" refers to desktop hardware which, by definition, is too small to be shared while in use. "Personal computing," has remained more obscure, even while millions of users enjoy the thing to which it refers. In fact, it is the most modern style of software for delivery of computing resources, and many minicomputers and even a few mainframes are capabie of supporting true personal computing software.

In overwheiming numbers, users have taken keyboards into their own hands, bringing personal computers into the office to assist them in their daily work. They are waging a kind of technologicai war against their DP ahops; these acquisitions are sometimes in spite of, or even against, corporate DP policies and plans. The article ". . . But E.F. Hutton Rejects Micros for Terminal Net" [CW, March 28] suggests that when Hutton DP management talks, its own end users may not listen.

For various reasons, DP shops are trying to restrain the proliferation of personal computers. The threatened decentralization of carefully archifected corporate data bases is a severe challenge to a DP department's responsibility and authority.

The antagonism thus engendered can be heard in such remarks aa "Personal computers allow users to strike back at DP for what they see as uncaring and unresponsive attitudes by DP for the users," from the article "MIS and Micros: Good Relationa?" [CW, March 28], and, "Using a mainframe to execute microcomputer programs is like using an 18-wheel tractor trailer to go to the store for a loaf of bread," from the Special Report article "Is Micro Migration Causing Data Base Mayhem?" [CW, March 28].

The first quote shows the point of view that is driving the auccess of the desktop computer market, and the second quote voices a widespread opinion about what computers "ought" to be doing. It's not the hardware that attracts the purchasers, it's the refreshing software, which is attentive and easy to learn and makes them productive and proficient within hours. It's not personal computers they're buying, it's personal computing!

Friendliness vs. Efficiency

The controversy focuses new light on an old debate about software friendliness vs. efficiency. In the past, users were scheduled for the convenience of the machine, data and programs were collected in efficient high-apeed printing and the user was provided hours to think about something else.

More modern operating systems provide interactive computing. The computer is now scheduling its resources to accommodate the user. The interactive computer user does not think any faster, but he apends less time not thinking.

While the efficiency experts bemoan the costly overhead of sophisticated file systems, commsnd languages and time-sharing schedulers, the interactive users are getting more work done with less manpower. Computer systems have been getting friendliar and friendlier all along. Clearly, as equipment prices fall and personnel costs rise, economics favor the computer aystem that does not rule its users, but serves them.

A desktop computer can do every bit as bad a job of

(Continued on Page 54)

Looking at the Difference Between MIS and DSS

(Continued from Page 49)

at the micro level by ignoring the issue. DSS attempts to provide tools that can take data from various systems and integrate it in the DSS environment.

Decision support is a valid concept whether the management perception is based on the decision theory approach to management, the systems approach, the situational or operational approach or any other perspective on management. It is, however, strongly oriented toward the decision approach with emphasis on decision-making processes. Regardless of approach, management must still have enough facts to understand the problem and make a decision on tactical, coordinative or strategic issues.

True decision support is still an evolving concept. Currently, it is primarily a theoretical framework and provides a vendor with the opportunity to tie a number of products together and market them as an integrated product line.

DSS-directed and end-user-directed systems development are attempts to solve the deficiencies involved in the current bureaucracy and system life-cycle processes currently in effect in most major data processing installations.

DPers have to realize that they exist to provide a service. If they cannot provide it in a timely, cost-effective manner, then someone will attempt to fill that vacuum. DSS hardware and software are examples of efforts to fill the void in service.

Lennon is manager of data administration at Key Services Corp. in Albany, N.Y.

Who's Managing Management?

(Continued from Page 51)

market today have been designed as aids for the operations area. Yet the proper training to support these packages is rarely given to those people who are held responsible.

The majority of computer installations still have job descriptions for operations that they had 10 years ago.

Management fails to realize that many people make mistakes simply because they don't know what their jobs are and have been improperly trained. Management continues to reprimand them every time something goes wrong. For the most part, people want to do a good job, but they have to know what their responsibilities are and how to perform their jobs properly.

It is frightening to realize that today, 10-year-old children have fewer fears about computers than do people in DP management, who are responsible for making decisions that impact entire corporations.

When are we going to realize that someone has to judge management?

Artibee is a senior consultant with D.W. Artibee Associates in St. Petersburg, Fla.

'It Looks Like a Mixture of Russian and Cobol.'

Personal Computers or Personal Computing?

(Continued from Page 52)

human interface as a mainframe, depending on the software it has. Balky command language, unclear prompts, awkward error-correction procedures and "batchy" processing are all software, not hardware, characteristics. A system that lets you enter a hundred lines of error-filled Basic code, and gives no feedback until 10 seconds after the RUN command is typed, is equally impersonal no matter what size hardware it'a run on.

Consumer-marketed computers have to be even more friendly because for the first time in computer marketing history, the end user and the purchaser are one and the same person.

While big computers can be sold on the basis of impressive cost/performance efficiency ratios to upper management executives who will never cope with the system personally, the desktop hardware must sell itself. Microcomputer vendors quickly discovered that a little software engineering can go a long way. "User-friendly" moves merchandise, and personal computing is the friendliest there is.

Personal computers have taken interactive software to its next step. In each succeeding software generation, the conceptual distance between user and CPU has been reduced. The unit of interaction grew smaller and smaller, from job to program to transaction to line. Most time-sharing systems now respond to the RETURN key with some kind of answer or action.

Personal computers characteristically go one step better: They interact at the keystroke level. Where would Visicorp's Visicalc be if it did not provide immediate feedback to each keystroke in the sequence "/," "D," "R"? Thus, "personal computing" may be defined: "keystroke-by-keystroke software interaction."

A Matter of Software

So personal computing is really a matter of software. But personal computing software can only exist in certain hardware environments. Here is a test for your system, if you're curious: Can you write and run a program that discriminates between vowels and consonants as they are typed, with no intervening keystrokes?

For example, if you type "AB1C," you should see:

A
That's a vowel.
B
That's a consonant.
1
That's not a letter.
C
That's a consonant.

Each response should be displayed immediately after each keystroke. The ability to receive any single keystroke and to transmit a response directly are essential for personal computing.

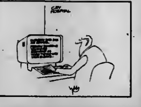
Obviously, block-mode (buffered) terminal systems are excluded, since a single keystroke just sits on the face of the CRT screen until SEND (or some such thing) is struck. Similarly, half-duplex or line-mode time-sharing systems cannot do personal computing because the processor does not get to see anything until the final RETURN is typed.

But for nearly all microcomputers, and most minicomputers and superminis, keystroke-level interaction is almost second nature. Among mainframes, I am aware of such capabilities only on Digital Equipment Corp.'s Decsystem-10 and Decsystem-20.

Perhaps for some of today's mainframe operating systems, the above 18-wheeler analogy is apt, but certainly not for all. Current time-sharing mainframe systems are more like 128-tentacled octopuses that can do many small tasks simultaneously or devote several arms to a few larger ones. In these systems, microcomputer user-friendly effects, such as online interactive Help facilities, diminish from overall equipment efficiency only slightly. The trade-off is .15 seconds of CPU time for 15 minutes of human time otherwise spent looking up documentation. A little bit of CPU, properly placed, can save a lot of more costly human effort.

There is little doubt that personal computing is here to stay; a million spreadsheet users cannot all be wrong. Already the history of mainframes can be seen, recapitulated, in the progress of microcomputer systems: word lengths are increasing, instruction sets are becoming more versatile and single-user systems are gaining background or multiterminal multiprogramming. Even microchip paged virtual memory is in the offing. Personal computers will grow larger. Large computers will grow more personal — or else they will disappear.

Klammer is president of Professional Software Support in Golden, Colo.



IBM CICS Users Offered Update Of 'Key/Master'

NORWALK, Conn. — TSI International has announced Release 3.0 of its Key/Master on-line data entry system.

Designed for IBM CICS-based systems, Key/Master now features a screen painting facility, new copy functions and enhanced system security, a vendor spokeswoman said.

The screen painting facility is said to provide users with the option of changing or adding formats by keying in the format image on the terminal. The on-line copy facility will reportedly allow the creation of copies of applications and individual formats interactively.

Access to sensitive data can now be restricted through a security feature that allows the assignment of limited functions to selected supervisor codes. Additional enhancements include a large screen support feature, able to accommodate several different terminal sizes, and language selections for Key/Master system screens and on-line messages in English, French or German.

The perpetual-use fee for DOS is $23,500 and $29,750 for OS. More information is available from the vendor at 50 Washington St., Norwalk, Conn. 06854.

MVS/XA Support Added To Vsam-Assist; Vcar Out

CLINTON, Md. — Softworks, Inc. has announced full support for IBM's MVS/XA operating system in its Vsam data and catalog management utility called Vsam-Assist. The company also announced Vsam Cobol Action Request (Vcar), a Vsam Cobol I/O logic error display unit.

Vsam-Assist runs on IBM's OS/VS operating system. It provides a method of backing up and recovering data sets, alternate indexes and paths; migrating large numbers of data sets to different volumes or device types; performing mass renames and deletions of data sets; and making mass changes to data set characteristics such as space allocations, control interval sizes and free space percentages, a spokesman said.

It optionally restores data sets with primary allocations that reflect actual data requirements, saving direct access storage device space by precluding overallocation. Users may perform mass deletion of selected and excluded data sets. A simulation model indicates which data sets would be deleted before the deletion takes place. The product is priced at $4,950.

Vcar is said to free programmers of the need to track down and determine the causes of I/O logic errors. Vcar links onto the Cobol program and is transparent to the user unless a logic error occurs, the spokesman said.

Vcar is priced at $3,000 per site. Both packages are available from 7801 Old Branch Ave., Clinton, Md. 20735.

CAI Update Adds Migration

JERICHO, N.Y. — Computer Associates International, Inc. (CAI) has announced the availability of Release 5 of their Direct Access Storage Device (Dasd) management product, CA-Manage/Dasd. The release is said to incorporate a new function that allows migration of data sets in program-readable form between devices.

CA-Manage/Dasd migration can be defined for automatic movement or can be handled on demand. It provides full support capabilities for Vsam data set name and group and user catalogs in the backup function. Release 5 supports Applied Data Research, Inc.'s Roscoe and IBM's Remote Access Control Facility for OS/MVS and System Productivity Facility.

A three-year license for CA-Manage/Dasd costs $7,000 from CAI, 125 Jericho Tnpk., Jericho, N.Y. 11753.

Bank Handles Item Processing With Micr

BATON ROUGE, La. — When City National Bank decided to upgrade its item processing software two years ago, the firm's search for a new system involved a projection of future needs as well as an examination of current requirements.

The system selected was University Computing Co.'s (UCC) Super Magnetic Ink Character Recognition (Micr). Explaining this selection, Steve Anderson, vice-president and assistant DP manager for the $450 million bank, said, "The UCC product gave us more of what we were looking for and met our reporting requirements. All Micr systems allow you to sort checks, send cash letters and to balance. But not all of them let you do cash management, control, disbursement and look at your internal efficiencies the way the UCC package does. We will also be able to upgrade to almost any sorter we want when the time comes."

Anderson set up an extensive month-long testing period and found that they were able to recover from every possible failure, including a complete loss of the system.

Another reason City National selected Super Micr was its Management Reporting System (MRS) component. Anderson said MRS is a tool that will become more and more useful as the bank continues to grow.

Before using the Micr system, Anderson set up an extensive month-long testing period with the help of operations officer and project leader Larry Flad. Once they verified that the product performed its claimed functions, they built a grid of the possible types of failures, categorizing these into six or seven major types and testing them within those types. They found that they were able to recover from every possible failure, including a complete loss of the system.

The Super Micr system later was installed and tested at City National's backup site in New Jersey on a different hardware configuration. It currently is operational at both sites.

Anderson said the conversion to Super Micr was successful for two reasons. First

(Continued on Page 60)

BGS Announces Release 2.0 Of 'Crystal' for IBM CPUs

WALTHAM, Mass. — BGS Systems, Inc. has announced Release 2.0 of Crystal, a performance analyzer for IBM mainframes running under IBM's MVS or VM operating systems.

Crystal allows analysis of performance characteristics of a new application before programming, a spokeswoman said. The analyst specifies key design parameters from the system specification document which the package uses to analyze the proposed system's performance.

The package provides a feasibility testing system which allows system parameters to be varied incrementally. The result is a performance curve showing the sensitivity of the system to one or more design parameters, the spokeswoman said.

For new applications using IBM's IMS or CICS, the Crystal/IMS or Crystal/CICS Modeling Support Libraries can be used to specify high-level information such as CICS file control calls or IMS DL/1 calls. The internal performance characteristics of IMS or CICS are automatically taken into account via the libraries.

The new release also incorporates a number of ease-of-use enhancements, the company claimed. The base price is $17,600 with the Modeling Support Libraries priced at $2,500 each and a 10% discount allowed for purchasing more than one product from BGS at 1 University Office Park, Waltham, Mass. 02254.

Utility Tool Fits System/38

BANGOR, Maine — A utility package for the IBM System/38 that is said to allow the programmer to inquire or update physical files by relative record number has been announced by Futurenow Software, Inc.

File Update and Inquiry Program (Fuip/38) allows data to be changed by keying over existing data (character or hexadecimal) and issuing an update command. As the data in the physical file is updated, all affected logical views are also updated, according to a vendor spokesman.

Fuip/38 was not designed to be used as a file maintenance utility, but as a programmer's tool, according to a spokesman for the vendor. It is said to be most useful during a conversion, if data is corrupted, or for checking a file quickly.

The utility costs $300 from Futurenow Software at 281 Center St., Bangor, Maine 04401.

Print Facility Lets CICS Users Print on 3270s

TORRANCE, Calif. — Data 21, Inc. has announced Remote Print Facility-Extended (RPF-E), a package that reportedly enables IBM CICS users to print, display and submit jobs on IBM 3270 terminals.

The system reportedly is end-user designed and provides menus and on-line help to accomplish each function, allowing the CICS 3270 user to function as a remote job entry station.

Unlike RPF, a version of the system that prints and displays reports directly from IBM's VSE/Power, RPF-E provides IBM's Vsam Entry Sequence Data Set spool file for added performance and function. Reports are copied into RPF-E from VSE/Power or Software Pursuit's MVT/VSE Sage spoolers via interfaces provided or written directly into RPF-E.

Other features include forms prompting, report retention, print priority, printer queue display and control of active and queued print tasks, comprehensive security definition, IBM's Forms Control Buffer support for 3270 printers and automatic in-service of printers.

RPF-E reportedly requires no modification to CICS, VSE or user applications and is available for a one-time price of $4,200 from Data 21, 19110 Van Ness Ave., Torrance, Calif. 90501.

Migration Aid Out for Singer

JACKSONVILLE, Fla. — Generic Systems, Inc. has announced a conversion program to aid users of Singer Information Systems' System 10 processors to migrate to IBM 4300 and compatible processors.

Called the System/10 Emulator, the product enables Singer 10 object code to be executed without modification on IBM mainframes, according to the vendor. No modifications of hardware or software are required. In addition, the package can run System 10 programs and systems software concurrently with a regular work load on the IBM machines, the vendor said.

The product runs under IBM's DOS/VS, DOS/VSE and MVS operating systems. Transaction processing is supported under CICS, the vendor said.

The conversion package costs from $9,600, depending on the Singer configuration being emulated. The vendor is located at 2123 Mango Place, Jacksonville, Fla. 32207.

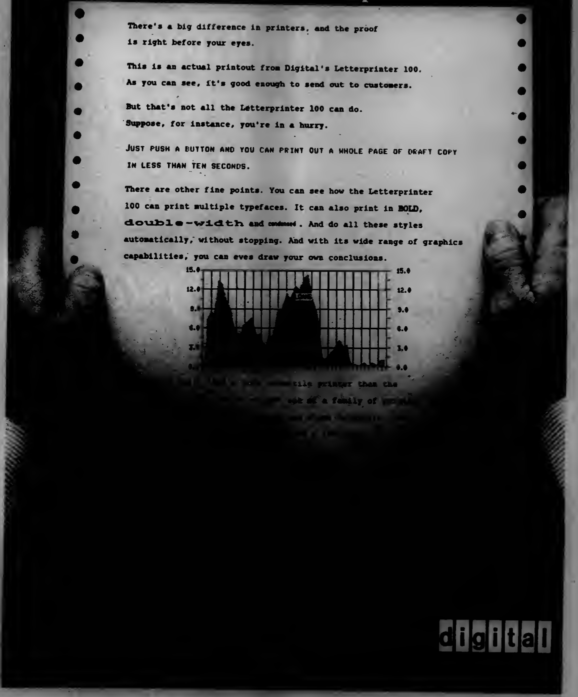
'Counselor' Program Offered to Law Firms

HIALEAH, Fla. — Business Computer Solutions, Inc. has announced the availability of a Wang Laboratories, Inc. Wang VS-compatible software program designed for law firms.

Counselor reportedly combines data and word processing into a system capable of tracking every productive minute of every professional in the firm. It reportedly can calculate the value of productive minutes, while it takes into account variations in the firm's standard billable rates.

Counselor is available from $5,000 from the firm at 1840 W. 49th St., Hialeah, Fla. 33012.

Before you buy a printer look at the fine print.



There's a big difference in printers, and the proof is right before your eyes.

This is an actual printout from Digital's Letterprinter 100. As you can see, it's good enough to send out to customers.

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Bank's Micr System Handles Item Processing

(Continued from Page 55)

of all, the bank spent two months at the beginning of the project documenting every transaction in the bank, writing these down and setting up manuals. "The second key was letting UCC write the custom code for the system and not trying to do it ourselves. That saved a lot of time and a lot of headaches," he added.

Since the product's installation, "we are meeting deadlines much earlier and have been able to reduce our staff from seven people to four. We are using those other three people much more effectively in other areas of the bank," Flad said.

Whereas the old system "was a nightmare to balance," Super Micr "keeps all our totals, all our job streams in one place and lets us know where we are at certain times of the day," Flan said. The account inquiry facility also is being used, particularly in the morning for the bank's controlled disbursement service.

According to Flad, the bank has realized a substantial income increase with the use of Super Micr because information on where items are being sent is now available.

City National's items processing department has increased its processing capacity from eight to 45 transactions a night, he said. The old system did not reenter rejects, and the rejects created balancing problems for each application. Balancing these applications had been a time-consuming procedure because they had to be handled manually the next day. The automation of this process has proven to be a time-saver for the bank.

He noted that the areas of the bank that have benefited the most from the new Micr system are DP, items processing and general ledger. "We were doing about 2,500 transactions a day by key master and keypunch," he said. "Now we're doing about 50, and those are adjustments that are done on-line through the department's general ledger system."

In addition to cutting down the volume of work, Flad said, the bank has reduced the number of keypunch errors by taking advantage of Super Micr's reject/reentry system. Another plus for the bank has been the fact that general ledger can be run in the daytime. This was not possible before because there was so much keypunch lag time.

With the control afforded by Super Micr, the items processing department can control all monetary transactions in a single fund. This ability offers a great internal operational advantage, Flad said. The only things that currently are not handled in the items processing department are commercial loans and certificates of deposit.

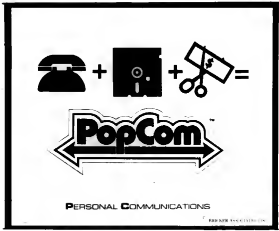
The float information generated by the Micr system is helping the bank keep its floats accurate, which is a necessity in times of high interest rates, according to Anderson. Clients want their money invested so they can get the best return, and they do not want a lot of money sitting in checking accounts.

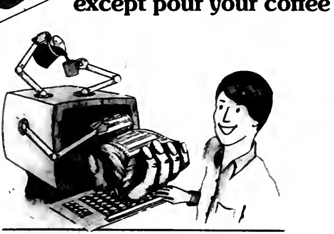
Bytel Offers 'Cogen' To Serve TI Minis

BERKELEY, Calif. — Bytel Corp., formerly Bytek, has announced implementation of its Cogen program generator for Texas Instruments, Inc. minicomputers running under DX 10 and Dnos.

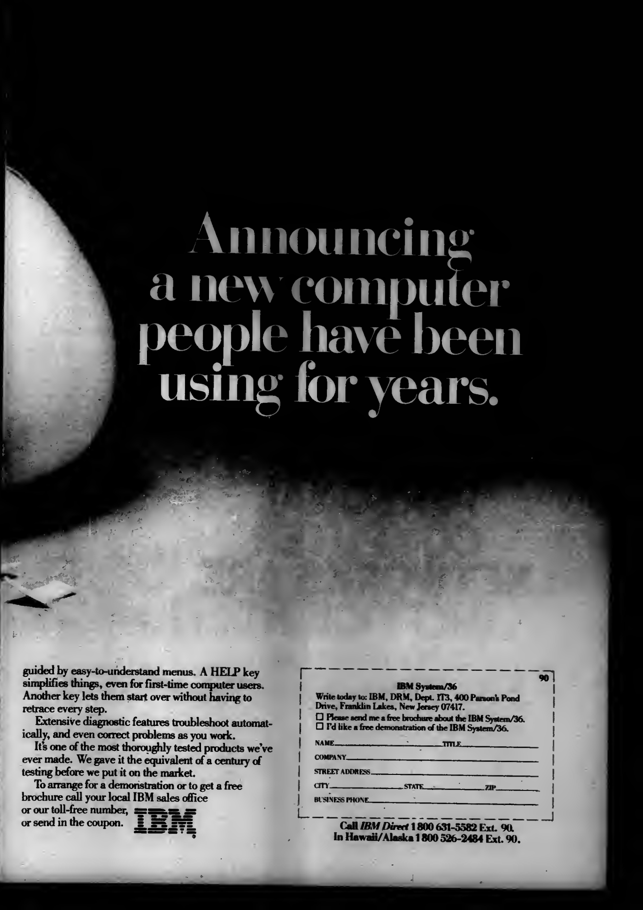
Cogen was designed for business applications. The package reportedly replaces the coding process with prompts and painting techniques for screen formats and report layouts, the vendor said.

The TI version of Cogen is priced at $1,950 from Bytel, 1730 Solano Ave., Berkeley, Calif. 94707.





IBM



'Telon' Upgrade Fits IMS-DC, CICS

QUINCY, Mass. — Christensen Systems, Inc. has announced an enhanced version of its Telon application development generator and productivity tool for IBM IMS-DC and CICS environments.

Included in the IMS-DC version of Telon is a line traffic optimizer, which reportedly reduces network transmission charges in distributed networks.

In order to cut overhead costs, the IMB-DC version of Telon has been converted from a conversational mode to a pseudo-conversational mode that uses a logical terminal data base. In addition, the IMS-DC release provides enhanced naming conventions so that users can match installation standards. Also, user-defined names can override Telon's IMS-DC naming conventions.

Features added to the latest release of Telon include support for IBM extended attribute terminals. An application migration path from a test environment to a production environment has been created for users. A program summary is also produced to highlight and document the implementation options in effect when the program is generated.

The IMC-DC version of Telon costs $90,000, the vendor said from One Heritage Drive, Quincy, Mass. 02171.

Processing Packages Fit IBM Micro, Displaywriter

DELRAY BEACH, Fla. — Advanced Software Products, Inc. has announced the availability of two products designed for distributed processing using the IBM Displaywriter and the IBM Personal Computer.

Introduced were the Virtual Cobol Host compiler Version 1.4 for OS/VS and the VM-86 multitasking, multiuser supervisor with virtual memory for both the IBM Displaywriter and the IBM Personal Computer.

The packages are designed to permit the users of IBM's small computers to centrally develop and maintain interactive Cobol applications using mainframe development tools and communications.

The Virtual Cobol Host compiler can be obtained on a trial basis for $1,000; a perpetual license costs $5,000 per system. VM-86 costs $1,000 per system for a perpetual license and includes two years of releases and fixes.

The vendor is located at 100 E. Linton Blvd., Tower B, Delray Beach, Fla. 33444.

I/O Driver Announced, Acts as Buffer

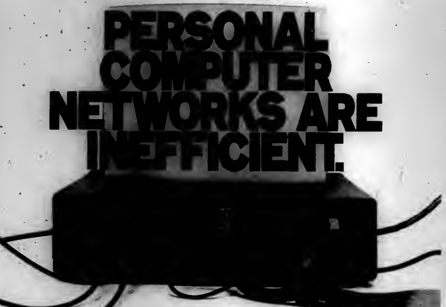
STATE COLLEGE, Pa. — Interactive Microwave, Inc. has unveiled an I/O driver said to act as a cache memory buffer during any disk's read/write operations.

Hypercache is compatible with Digital Equipment Corp.'s RT-11 and TSX-Plus operating systems, the vendor said.

Hypercache reportedly keeps a duplicate copy of the most frequently or recently used data in a cache memory buffer (4K bytes to 4M bytes). It is said to make use of the memory that overlaps the I/O page and to eliminate the need for search, sort or merge routines.

The vendor said the software requires no special hardware and will run in both 18-bit and 22-bit (256K and 4M byte) systems with a memory management unit. It will also run in 22-bit memory systems with 18-bit controllers.

Hypercache is available for $295 on a floppy disk; the manual may be purchased separately for $5. Interactive Microwave can be reached through P.O. Box 771, State College, Pa. 16801:



'System/Manager' Updated for DOS/VSE Users

BOSTON — Corodale, Inc. has announced Version 4.15 of its System/Manager package for users of IBM's DOS/VSE operating system.

Featured in the updated version are enhancements to the tape manager component of the package. Also, the vendor has added an Audit Trail recording and reporting facility for all permanent tape and optional disk file activity. A feature that allows automated recovery of tape files has been added along with a feature that offers volume information for restoring the System Catalog.

An audit file is automatically updated whenever any permanent file is created, accessed, modified or deleted by any System/Manager component. This, the vendor said, enables System/Manager to reconstruct automatically tape file and volume information if necessary.

In addition, Tape/Manager now supports multifile tape volumes. In order to minimize the number of tape volumes required, the user may stack multiple tape files on one reel of tape. Tape/Manager controls the creation and access to such files, the vendor said.

An enhancement to System/Manager's multiple CPU support allows the system administrator to reset ownership of files that are in use when one CPU becomes inoperable. Also, access to disk volumes can be restricted by the CPU.

System/Manager consists of two parts: Tape/Manager and Space/Manager. The System/Manager package costs from $7,500 to $20,000, depending on features selected. The Audit Trail facility costs $1,000 or can be leased for a monthly fee of $30 to $55. The component packages can also be purchased separately. The Tape/Manager package costs $7,500 and the Space/Manager package costs $8,500, the vendor said from 211 Congress St., Boston, Mass. 02110.

Security, Time Stamp Added To 'Flee/XP' for DOS/VSE

COLUMBUS, Ohio — Goal Systems International, Inc. has announced Release 8.2 of Flee/Extended Productivity (XP) library management system for the IBM DOS/VSE operating system. The release includes the following enhancements:

- Audit trail time stamps have been added to the core image and procedure libraries. Time stamp information includes date, time and type of maintenance, when the member was created and the number of times the member was cataloged and copied.
- An extended directory display facility reports library members in size sequence, libraries with integrity errors and libraries from which specific programs are executed.
- The system reuses library space. Condenses can be performed without interrupting IBM CICS.
- Advanced library security has been added through a library access control exit to Flee/XP security. Users can tailor security and add installation-dependent security, a spokesman said.

The new release costs $5040 or $126/mo for a three-year license from 5455 N. High St., Columbus, Ohio 43214.

Training Course Provides Info On IBM's IMS

BELLEVUE, Wash. — Software Information Services, Inc. has added an additional course, "IMS Master Terminal Operator Workshop," to its line of in-house training courses.

The four-day training course is directed to master terminal operators and data base administration personnel who require more knowledge of the functions and operations of a master terminal in an IBM IMS environment.

The workshop provides an introduction to the IMS data base management system from an operations standpoint and places a special emphasis on the understanding of IBM master terminal operations and their effect on appplications. Typical examples and workshop problems will be used, both in the classroom and in live demonstrations, the vendor said.

The objectives of the course are for the student to be able to list responsibilities of a master terminal operator, to describe an appropriate response to given problem situations, to understand the timing and use of various recovery techniques and to execute the standard master terminal commands, the vendor said.

The course costs $3,100, and 20 students can participate. Instructor travel and subsistence costs are included in the course price as is the cost of course materials.

The vendor can be reached through P.O. Box 4132, Bellevue, Wash. 98009.

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Dasd Offers File Translator

MILWAUKEE — Dasd Corp. has introduced Universal File Translator, which is said to convert sequential, multirecord files from any mainframe model to another containing different data formats or representations. The package runs on any mainframe operating system that supports Ansi 74 Cobol and binary arithmetic.

The translator eliminates the need to write programs to convert every file or reenter data into the new machine, a spokesman said. The translator deletes bad information, expands existing formats with larger storage fields or generates new empty spaces for data.

Using a method of interpretive byte reconstruction, the translator rebuilds virtually all data types, but will convert only one type of file at a time, the spokesman noted. It is parameter-driven, and the parameters are unformatted after the first control character.

Universal File Translator costs $10,000 for a one-time license fee from Dasd through P.O. Box 23676, 9045 N. Deerwood Drive, Milwaukee, Wisc. 53223.

Virtual RT-11 Announced For DEC VAX-11

BETHESDA, Md. — Contel Information Systems, Inc. has announced the availability of Virtual RT-11 (VRT) for users of Digital Equipment Corp. VAX-11 superminicomputers.

VRT is said to be a high-efficiency emulation of DEC's RT-11 operating system. VRT is said to provide an environment that supports both run-time applications and program development.

The software includes a Virtual Interchange Program (VIP), which reportedly allows users to move files between RT-11 and Files-11 formats.

VRT is priced at $1,250 until August 1, when the list price of $1,750 is effective. More information is available from Contel's Small Computer Systems Group, 4330 East-West Highway, Bethesda, Md. 20814.

'FIN/38' Runs On System/38

INDIANAPOLIS — Data Processing Services, inc. (DPS) has announced the availability of FIN/38, said to be a fully integrated financial package for the IBM System/38 that includes payroll, accounts payable and general ledger.

FIN/38 is written in RPG-III structured code and encompasses externally described data base files. Some of the major features include three reporting levels, detail audit trails, on-line entry and inquiry and a report writer.

In conjunction with the release of FIN/38, DPS has initiated an introductory offer that includes free IBM hardware with the purchase of one, two or all three applications, a vendor spokesman said.

Each FIN/38 application costs $4,250; all three can be purchased for $9,995, according to the vendor at 8604 Allisonville Road, Indianapolis, Ind. 46250.

'Amaps' Enhanced For Government Contractors

MINNEAPOLIS — Comserv Corp. has released a version of its Amaps manufacturing software specially designed to satisfy the requirements of government contractors.

The first major offering from Comserv's newly formed Special Products Group, Amaps/G is a special version of the recently released Amaps Quantum Series software said to incorporate features and functions intended to aid government contractors in complying with the control and reporting requirements imposed upon them.

To aid engineering functions, Amaps/G features separate engineering and manufacturing bills of material, configuration control, engineering change effectivity by serial number and 40-char. part numbers. Material Control features include material control by contract, material requirements planning by contract and lot traceability. All these features will be built into five modular subsystems.

Amaps/G is approximately $80,000 per module. Comserv Corp. is located at 3400 Comserv Drive, Eagan, Minn. 55122.

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The OA Focus section of the next *Computerworld OA* will provide comprehensive coverage of data bases, software conversions, decision support systems, information centers, the user interface and much more. We'll showcase vendor directions, what benefits are available now and what users should plan for in the future. We'll summarize the latest information from developers and highlight emerging trends in order to bring both long-term and specific guidelines to those responsible for planning and purchasing software for their organizations.

In addition to the OA Focus on Software, *Computerworld OA* will feature a survey of real users of information centers, present a case history of a large bank user and will have articles on subjects such as cost justification, ergonomics and remote work sites.

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Venture Capital

An Inside Look

Money Chasing Innovation

By Henry and Elizabeth Urrows

Venture capitalists create new businesses or expand and revitalize existing ones by making high-risk, high-reward investments in the ideas of entrepreneurs. Two of every three current ventures relate to the information and electronics industries. Management information systems (MIS) professionals who closely follow these venture capital decisions will be least surprised by the swift changes in high-technology systems and products.

The U.S. General Accounting Office projects that for every $1,000 of venture capital invested in the 1970s, $40,000 to $54,000 worth of productivity-enhancing goods and services will be sold during the 1980s.

The *Guide to Venture Capital Sources* lists 550 U.S. and Canadian firms. Publisher Stanley Pratt reckons that the total venture capital (VC) pool reached $6.7 billion by mid-1982. He defined this amount as what private VC firms, small business investment corporations and corporate subsidiaries invested at cost. The 130-member National Association of VCs estimates that professional VC organizations invest $1.4 billion a year.

The Department of Labor's 1978 interpretation of the 1974 Employment Retirement Income Security Act allows pension funds to invest 0.1% of assets in new ventures. Slender as that percentage seems, it translates to $400 million in 1982, the largest source of money for independent private VC firms.

Successful innovations come mostly from small companies which adapt more quickly, communicate more easily and operate nearer changing markets, as compared with larger corporations. The major conglomerates typically take 10 years or longer to commercialize a product that a small outfit could market in five to seven years. A National Science Foundation study found that small firms spend their research and development money four times more effectively.

The venture capital scene has changed greatly since the late 1960s. Ed Glassmeyer, president of Oak Investment Partners in Westport, Conn., says, "When we started, we used to sit back at our desks and read proposals that came in or visit with entrepreneurs as they came through

How a Venture Capitalist Judges His Prospects

Kenneth Rind of Oxford Partners states clearly what he, as a venture capitalist, seeks: (1) an innovative, superior product or service based on proprietary capability and a broad technology; (2) a large, rapid growth market; and (3) superior management.

"We really look for companies that have the leading technologists in the business and a knowledgeable marketing man," Rind says.

He tells how one typical investigation was conducted: After hearing about a new venture, he and Neil Ryan exchanged visits with the project's principals. They talked with three of the company's competitors, five customers and two suppliers; checked with their superiors, subordinates, peers, past company officers as well as their banker, accountant and lawyer.

Oxford called in an expert consultant, met with two potential customers to get reactions on the products, spoke with an editor of an industry publication and saw the company's major customer. They asked two other venture capitalists to make their independent checks.

Oxford finally negotiated the agreement in June. "We have lost one or two deals because other people have rushed in," Rind concedes, "but we feel more comfortable doing it this way."

Rind uses as an example of fair VC pricing a company that appreciates 10 times its value in five years at 10 times P/E, if it meets its projections.

"That is a 60% per year compound return," he points out. "We will not get that most of the time, but we will exceed that level some fraction of the time, which will permit us to achieve our overall goal of about 40% per year."

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the city requesting funds. We could make a decision to invest and not worry that 20 other venture groups would bid against us. We had plenty of time to assemble a syndicate.

"We had a division of labor. One investor would handle market analysis. Another would examine management backgrounds. Another might analyze financial factors. The whole process would take about four to five months. Never during that time would the entrepreneur go out and seek a competitive offer.

"That was 1970; 1983 is very different," Glassmeyer says. "The cycle time for the investment process has gone from, say, four to six months to four to six weeks." The shorter analysis period requires concentrating on a few related fields. "If you are going to finance a company in four to six weeks after your initial meeting, you better have an organization that really understands the business. You must have a large team with depth to do a thorough analysis and know the product compared to others now and those likely to come on the market."

Keeping Up

Dennis Nosal, information systems manager at Time, Inc., says two people in his group follow new developments in printing, information systems and telecommunications technology part time. Time is especially interested in automated pagination and page makeup. Nosal would like enough staff to track what is new full time.

Xerox Corp. has that luxury. Of the 3,800 professional staff concerned with DP, office automation, telecommunications systems and programs, six professionals on the corporate staff at the Stamford, Conn., headquarters and 10 in Rochester, N.Y., keep corporate information management director James F. Sutter briefed on changing technology.

Xerox courses on microelectronics and software technology are updated with emphasis on the effects of new products. The venture capital watchers attend meetings and scrutinize literature put out by the Diebold Research Program, Arthur D. Little, Inc., the MIT Center for Information Systems Development, the Society for Information Management in Chicago and the Office Technology Research Group run by John J. Connell in Pasadena, Calif. One staff person tracks activities in Japan at Fuji Xerox and other companies.

Not as formalized is Sutter's frequent recourse to the terminal on his desk, hooked by Ethernet to the Xerox Research Laboratory at Palo Alto. This connection enables close attention to developments in printing, microprocessing and record processing.

Union Carbide Corp. may be finding a fresh approach. Until February, its office technology people relied on six consultants within the company and three trainees. Now two internal consulting groups, encompassing 40 people, are entrusted with seminars and other regular information exchanges that deal with corporate communications and applications of technology, ranging from changing applications through computer-aided manufacturing and robotics. If it works, this approach may be one way for MIS people to stand at the nerve center that affects corporate decisions and investments.

One Fortune 500 firm where MIS people track high tech closely tied to its venture search is Merrill Lynch and Co. Gerald H. Ely, technology planning director for the Merrill Lynch holding company, has a staff of 30, including 24 professionals. Their mission is to keep abreast of computer applications, networks, office automation and home communications as they shape up for the coming five, 10 and 15 years. Their findings have fallout for Merrill Lynch Venture Partners. They don't get into day-to-day MIS operations or decisions except when they impinge on long-term facilities and practices that serve Merrill Lynch's 500 U.S. offices and those in 40 other countries.

Venture capitalists are far from universally admired. Critics say they originate nothing, merely respond — get in for a fast buck and then move on to another project. They push fads, says Jerry Wasserman, senior consultant for information systems at Arthur D. Little, Inc. "They used to peddle anything with *onics* at the end of its name."

Recent Trends

The venture capital field has had dramatic ups and downs since World War II. In 1977, money for new ventures virtually dried up. But in the last 5½ years, the field has expanded to commit more capital than in the previous three decades. Trends are clear:

1. Corporate VC directors have left to join independent partnerships. These attract money from corporations, often with understandings of what the companies hope to find in the way of technical advances.

On Oct. 1, 1981, Pedro A. Castillo formed Fairfield Venture Management Co. in Stamford, Conn., which obtained $22.8 million to invest and $7 million more in 1982. He had directed General Electric Co.'s venture capital affiliate, representing it as lead investor on Applicon, Inc.'s board of directors for 10 years. GE's VC affiliate continues. GE and other firms invest as limited partners.

The nuclear physicist Kenneth Rind was a principal at Xerox Development Corp., responsible for VC investments and acquisitions from 1976 to 1981. Xerox did so well — reportedly getting $50 million market value from $10 million risked — that Rind and Cornelius Ryan (who had resigned as president of GTE Ventures) had little difficulty in raising $20 million for their Oxford Venture Fund. Among the investors are the pension funds of GE and NCR Corp., foundations, bank trust departments, insurance companies and individuals in the U.S. and abroad.

VC specialists leave companies because they make more money as independents. Kenneth Colmen wrote a 1979 SRI International report on new ventures generated inside corporations. He concluded that experienced people are hard to attract and keep "without special compensation packages, which are almost impossible to structure since corporations find it difficult to provide an incentive bonus arrangement." Rind puts it simply: "Corporations have lost qualified people at an accelerating rate because of the more attractive financial rewards on the outside."

Rind contributed a paper to the April-June 1981 *Strategic Management Journal* listing 34 companies that no longer make their own direct VC investments. Aluminum Co. of America, Bechtel Group, Inc., Dow Chemical Co., Du Pont de Nemours & Co., General Telephone & Electronics, Mobil Corp., Scott Paper Co., Union Carbide Corp. and Weyerhaeuser Co. are named. A 1978 Tektronix, Inc. survey found that only 7% of corporate VC groups saw themselves as being very successful; more than half did not rate their performance as even marginally successful.

GTE, 3M and Corning Glass Works now make VC investments only through outside partnerships. EG&G, GE, Inco, Emerson Electric Co., Monsanto Co., Northern Telecom and Xerox supplement their direct VC programs with external participation.

2. Many VC partnerships work together closely, syndicating their ventures. This approach reinforces individual judgments and shares bigh risks.

One of 10 investments in the Oxford Venture Fund portfolio at the start of 1983 is Computer Design & Applications, Inc. (CD&A) of Newton, Mass., maker of array processors and graphics displays. Oxford contributed $600,000 in three parts.

Venture capitalists often hunt in packs. The other CD&A investors include the $250 million Kleiner, Perkins, Caufield & Byers group of San Francisco, GE Capital Corp. and Venrock (Rockefellers).

Oxford invested $250,000 in the $5 million first stage of Telesis Corp., Concord, Mass., in January 1982. An additional $1 million financing closed in April 1982. Eleven other venture capitalists took part. Oxford put $400,000 last October in the second stage for California Devices, the customized gate array chip maker, with the Innoven Group of Saddle Brook, N.J., Alan Patricof Associates of New York, Bay Partners of Mountain View, Calif., and others.

The spirit among VC firms is not always so collegial. The epic victory scored by the first public VC organization, American Research & Development (ARD), from its $70,000 venture in 1957 with Digital Equipment Corp. was as sole investor. Kenneth H. Olsen and two other engineers from MIT's Lincoln Laboratory planned to offer fast, inexpensive, small computers as an alternative to slow, expensive mainframes. Without any business experience, they invented a new industry.

The venturer was Gen. Georges F. Doriot, whose Harvard Business School course on manufacturing is still remembered by many graduates. He became ARD's first president in 1946 and is still on the DEC board.

The $70,000 sown in 1957 became worth $490 million in 1977 market value. When the capital gains tax was 48%, ARD would have had to pay the IRS nearly half the gains it made from DEC and from other ventures. Instead of dissolving, ARD went private, merging with Textron in 1972 and dividing its DEC stock among ARD shareholders.

3. When a venture does not meet its stated objectives, the venture capitalists step in and see to it that changes — sometimes in management — take place.

Ken Rind has explained how Oxford Partners, in an agreement to invest, insists "on having provisions for taking control of the board if the management does not meet its goals; to make an adjustment in the price if the forecasts are not met; and an anti-dilution ratchet on the price if we have to put in more money at a lower price."

From the outside, invoking such rights looks like those with money driving out the people with ideas whose company it is — or was. In about half the investments, venture capitalists find they must "augment" management with a new chief operating or executive officer. Rind says, "You try to keep the entrepreneur in the company doing his thing, whether it is marketing or R&D." Peter Bancroft of Bessemer Venture Partners in New York is quoted as saying, "You are not really a venture capitalist until you have replaced the person you brought in to replace the entrepreneur that you invested in."

An entrepreneur who puts such an impasse into clear perspective is Donald J. Kramer, president of Henrix Electronics in Manchester, N.H., since 1978, when a group of venture capitalists asked him to take the post.

If a venture investor has a strong conviction that differs from his, Kramer says he "would argue with him as I would argue with any boss — if I felt it important." If the boss finally said, "I want it done such and so," Kramer says he would then decide whether he could do it or not. If not, he'd say, "You ought to get someone else who can do it . . . I don't present that as a threat, just a statement of fact."

He gets especially annoyed at directors' meetings when a venture capitalist confuses director and stockholder roles. A director's responsibility is to the company and all stockholders, not to the venture fund.

"My response to this problem," Kramer states in the 1982 book *How to Raise Venture Capital* (Scribners), "is to point out that at a board meeting you only get one vote whether you own 10% or 99% or nothing. If you want a stockholders' meeting, go call one. If you want to run the whole company, then buy the company and do whatever the hell you want."

Mutual confidence is the key to dealing with venture capitalists, he is sure. He says: "How do you develop this confidence? It is by doing what you say you are going to do."

4. The field is becoming increasingly competitive and specialized, requiring thorough knowledge of a particular market.

Consider Glassmeyer, Oak Investment Partners' president. Oak concentrates on office and factory automation, financing systems companies that integrate elements of computers and peripherals to perform specific functions.

When Glassmeyer and Stewart Greenfield were with Sprout Funds, the venture capital partnership owned by Donaldson, Lufkin & Jenrette, they were the lead investors in Shugart Associates.

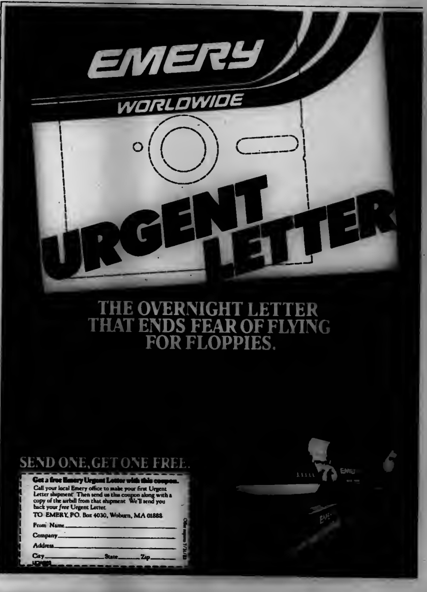
They had talked with Al Shugart when he was at Memorex Corp. and encouraged him to leave before trying to start the independent Shugart Associstes, which Xerox bought in 1977 for $44 million. (Annual revenues have since gone from $35 million to $200 million; Shugart's share was less than 1%.) Glassmeyer and Greenfield left Sprout in the recession year 1974. They consulted on new business until they obtained $25 million to begin Oak at the end of 1978.

After Shugart told them of his plans for Seagate Technology, Inc. — to miniaturize Winchester disk drives to the ideal 5¼-in. size for desktop computers — they were inclined to favor it. Oak asked him, "Can you build this for less than the 8-in. drive?" Shugart's answer in October 1979 was no. "We did not commit to him until June 1980, after he had signed up a development contract from Dysan and had demonstrated that he could, in fact, build a 5¼-in. at a lower cost than the 8-in. Winchester," Glassmeyer says. "We didn't think the market would pay more for miniaturization. Seagate reengineered the product and got the cost down.

"It didn't appear to us that Al and Finis Connor, Al's partner, had the competitive edge when we first talked. We also had to see evidence there would be a disk supplier who would gear up to produce the number of disks to match Al's forecast. It was Dysan that in fact invested more money in the manufacturing of a disk than we did to build the drives — I'd guess $5 million. There was only $1 million in venture capital.

"Al was resourceful and financed Seagate by selling manufacturing licenses. He identified companies that weren't likely to become big competitive threats to him [even though] it was some concern to us that they were giving away their birthright to licensees . . But Seagate got off to such a fast start, they captured the role of industry leader. As such they established their first product, the ST-506, as the industry standard. Controller manufacturers standardized on Seagate so other 5¼-in. manufacturers must now be ST-506, Seagate-compatible. Seagate had no effective competition for its first year of operation."

By the time Oak decided Seagate was a winner, Shugart and Connor knew it, too. They had Dysan as a 50% shareholder. All Al Shugart needed was capital to move into a



larger facility and to buy equipment. As Glassmeyer puts it, Shugart "had in his mind the idea of working with an investor who was looking for a strategic win and would pay a high price for his stock for that reason. He was talking to major European computer manufacturers who had given him the idea that he could raise money at a $12 million valuation."

Oak felt that was excessive and looked for a way to convince Shugart that "he should bring us in at a $5 million valuation."

Glassmeyer and Greenfield decided that words alone were not enough. Siemens AG and other European interests had teased Shugart with visions. Oak had come to know Norm Dion, CEO of Dysan, through helping get Dysan started in January 1980. Glassmeyer explains: "The problem was to get Al and Norm to focus on our proposal. For impact on Al, I flew to California. I told him that rather than waste a lot of time negotiating, we were prepared to underwrite the whole financing. I put in front of him a check for $1 million. It did take Al by surprise, I think. Al called Norm. They agreed to the deal."

Competition, Cooperation

The traditional posture of venture capitalist is that of buyer, but as some chances appear hot, the field has become very competitive. Because Seagate has grown to reap $100 million in revenues and its publicly sold stock has done well, that day's work by Glassmeyer was unusually profitable to Oak.

But Oak also invited and encouraged Institutional Venture Associates (IVA) to join as partner. IVA had introduced Oak to its first winner, Triad Systems, whose minicomputer-based products for distributors of auto parts and other warehoused inventories have yielded good profits. "There's an important reciprocity credo in our business," Glassmeyer says.

Oak's average liquidation price has been about 10 times cost. With Seagate it has been between 50 and 75 times. The $500,000 investment will probably make $30 million for Oak.

Ahead of Target

The day after Christmas 1978, shortly following Oak's funding at $25 million, the firm's general partners defined their business purpose. They set out to improve worth to $100 million, return all limited partners' capital by 1985, build a solid reputation and realize the full potential of each investment.

Oak does not want just to hold securities but rather seeks to help the businesses grow. The firm is ahead of plan, having met the $100 million-plus target and returned investors' capital in January of this year. By late 1981, Oak II attracted $60.6 million for its expanded work. At the present rate, it will have invested $50 million of this amount in 1983.

But like nearly all firms, Oak has bitten the dust several times. The group sold or liquidated five out of 54 investments. Among these were Anchor Petroleum, an attempt to hedge against high oil prices, and Midway Airlines, a "nonstrategic experiment."

Sticking to known terrain, Oak keeps finding that a wide circle of close acquaintances pays off. After Don Massaro talked with Bill Hambrecht and Oak about helping finance his new company, Metaphor (to product terminals and supporting software designed for executives), the word got out that he was leaving Xerox. The venture capitalists descended on him and $5 million was invested.

Glassmeyer says, "If we hadn't known Don, we never would have got in on the deal. There was just too much interest cascading on the project in too short a period. You also have to identify with the company's basic plan or strategy. We knew Don's plan because we have three former Xerox professionals on our team who knew what Don was doing there and understood both the technology behind his product concept and his proposed approach to market it."

Keeping on Course

Oak, like many venture capital outfits, often acts as an executive

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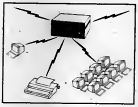

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Glassmeyer feels that Oak's concentration on MIS-related industry pays when a company gets into trouble: "Sure we have had problem companies, but in most cases we have been able to attract a new manager or establish a new direction or focus for the business. You almost have to have an inventory of people so that when a company gets into trouble . . . with a little persuasion and force of logic, you can bolster it with people you have already worked with from within the industry. If we were spread out over a whole array of industries, there would be no way quickly to identify a group of people who could readily help."

'Venture capitalists are so selective in the high risks they take that many promising and potentially important new enterprises must find their capital elsewhere. In 1981, the VC community received approximately 6,000 proposals and funded about 900.'

An Apprenticeship Business

Stanley Pratt, editor and publisher of *Venture Capital Journal*, believes an experienced venture capitalist should stay active during the entire investment cycle of about seven years. In the October 1982 issue of his journal, he analyzed the experience of 61 new funds capitalized with $1.2 billion from 1977 to mid-1982. He found that 41, or 67%, of the new groups had at least one general partner with a minimum of six years' experience. Seventy-seven percent, or $936 million, of the amount invested in new partnerships went to groups meeting that criterion. (Conversely, 20 of the firms handling 23% of the money did not meet this criterion.)

Pratt observed that value-added services to assist entrepreneurs such as market analysis, sales support, supplier relationships and executive recruitment are assigned to apprentice professionals and support staff. "Professionals can then concentrate their experience and intuition on the human relationships critical to the venture development process," he said.

According to Ken Rind, "The best background for someone who wants to become a venture capitalist is to be a venture capitalist . . . While there are some people who have come out of business school and are trainees, you will find that most people in the new partnerships have substantial experience. Venture capital is really an apprenticeship business."

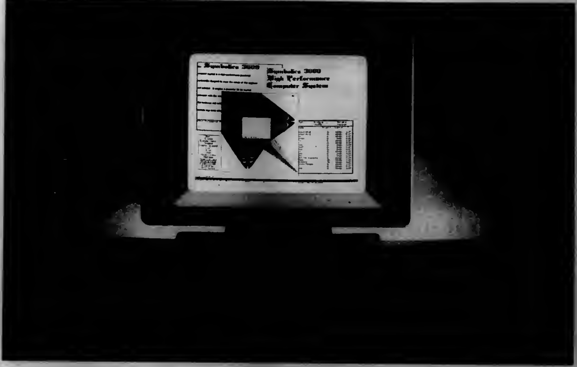
Donald Kramer, Hendrix Electronics president, is less than pleased with apprentices: "Venture firms tend to hire very bright guys out of graduate schools in their late 20s — smart as hell and hard working. But at least half of them do not know a thing initially. They get on a board of directors and end up getting on-the-job training. Sometimes they can be very counterproductive.

"The problem is that they are so bright," Kramer says. "If they were stupid, they would be easy to deal with — you'd just blow them away. But you can't. They've got a gem of an idea or they have unshakable curiosity and you'll end up conducting a lecture and a training session.

"Every venture guy thinks he is a strategist. I disagree with a number of venture philosophies and one of them is 'strategic thinking.' So many of them have been educated in the two or three top business schools that they all think alike — not necessarily correctly, but alike."

Selective Risk Taking

Venture capitalists are so selective in the high risks they take that many promising and potentially important new enterprises must find their capital elsewhere. In 1981, the VC community received approximately 6,000



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proposals and funded about 900. We found no evaluations of the 5,100 rejects, but encountered reliable appreciations of two ventures launched by an eminent scientist, a start-up by young entrepreneurs that has shown high promise but which venture capitalists in Boston did not take seriously and a high-performance large computer enterprise by experienced managers who said they would have had to sell too much equity if they had gone the venture capital route.

Dr. Henry H. Kolm, cofounder of the Francis H. Bitter National Magnet Laboratory at MIT, castigates venture capitalists for their "third-rate minds." His company, Piezo Electric Products, patented a prototype dot matrix printer head that should at least double the current 200-characters-per-second rate by eliminating the size and heat dissipation limits of present magnetic printing heads.

Kolm'a impatience with unadventurous venturers stems from frustration. Some needs are blindingly obvious to him, as are the means to fill them, exemplified by his work in magnetic levitation. The idea frightens off venture capitalists, but German and Japanese trains already run based on work Kolm and Richard Thornton began with the Magneplane in 1969.

Another young company unable to win venture capital backing is Laserdata, Inc. Its 12-in. optical video disk stores roughly a million pages of full text on one side. Through a link to a micro, a user can search down to a single word within seconds. Steven Yelick did much of the major work mixing digital data with video at the MIT Architecture Machine Group. He and two others canvassed Boston venture groups who were generous with advice but little else. The three, in their mid-20s, recruited Martin Hensel as president.

Laserdata found two customers who put up $500,000 for 1982 R&D. It is getting $750,000 more and making deliveries this spring of nine DataMaster models plus mastering, encryption, data compression and machine-readable conversion services for what David Margulies, president of BRS Medical, terms "the last major Invention necessary to change totally the way knowledge is distributed and used."

Amdahl Experience

"If we had gone the venture capital route, we'd have been forced to sell more than 100% of the company," Gene M. Amdahl, chairman of Trilogy, Ltd., says. He and his son Carlton organized Trilogy in early 1980 to develop large-scale, high-performance, IBM-compatible general-purpose mainframe systems competitive with IBM, Amdahl Corp., Fujitsu and Hitachi.

Trilogy does not intend to vie with the even larger and faster scientific machines made by Cray Research, Inc. and Control Data Corp. but states it will offer "an attractively priced general-purpose computer which is fast enough to be capable of certain limited scientific applications." The company aims to market by 1985 systems that either can exceed the IBM 3081'a 10 million instructions per second (Mips) or will sell for less.

Within a year Trilogy lined up $182 million: $55 million of R&D money from limited partners and $52 million in an equity stock issue. The balance was $22 million from Cupertino Facilities Development for use of about 242,000 square feet of space for semiconductor facilities for development, $20 million in equipment lease financing, $18 million in financing and grants negotiated with the Irish Industrial Development Authority for the 100,000-square-foot main manufacturing plant in Dublin, $13.5 million in three years' interest from money raised and $1.5 million Series A Preferred Stock and seed money put up by the founders who, unusually, retained about 71% ownership of the equity. Even with broad public ownership, employees will own an estimated 40%.

MIS departments normally would not learn about plans of companies like Trilogy through VC firms or publications. But the VC *Journal* reported on the Amdahls' Acsys, Ltd. as far back as October 1980, just after they had renamed the holding company they incorporated as Trilogy,

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then reported on Trilogy Systems in September 1981, a month after *Electronic News* and the August Merrill Lynch prospectus for $55 million from limited partners. The point still holds: It would be worthwhile to track prospecti circulated by investment banking firms that have demonstrated their high-tech interests.

Causes for Failure

A success can result from a diverse concurrence of conditions, forces, persons, ideas and events, but the key cause of a failure can frequently be isolated and examined. Venture capitalists say that troubles come most often from people, because it is difficult to predict how a person who succeeded in one kind of task will do in a different, more demanding job. The pressures on a CEO in a new venture often weaken and can destroy him.

Mead Data Central and Etec are successes whose venture capitalists did not foresee what would eventually happen in the way of products brought to market. And Peter Imperiale, now with Xerox, tells about a failure of a firm with a digital gas analysis system whose venture capitalists did not persuade its CEO to sell in concert with large companies.

Mead owns and operates the highly profitable Lexis computer-based legal research service. It does not publish financial data, but Senior Vice-President Robert O'Hara says revenues are now $100 million per year, give or take $10 million. Neither the original entrepreneurs, venture capitalists nor Mead could have foretold this result. CEO William L. Gorog and software director Lyle Cahill persuaded J.H. Whitney & Co. and Greylock Management of Boston to buy into Data Corp. in the mid-1960s when it was doing sole-source, quick-turnaround contract work for Wright, Patterson and Rome Air Force bases. Gorog stayed with Mead on R&D supervision.

According to O'Hara, Mead Corp. bought Data Corp. because Mead Chairman James McSwiney believed in business possibilities from the latter's Recon Central system for retrieving aerial reconnaissance photos and a new method for ink-jet print. Mead was not especially aware that Data Corp. also had contracted with the Ohio Bar Association to furnish a computerized legal research system. Its awareness improved when Bill Gorog spent Mead money for R&D after using up funds the Bar Association raised through a bond issue and loan. In 1969 Mead retained Arthur D. Little, Inc. (ADL) to assess market potentials.

Heading the ADL team was H. Donald Wilson, the lawyer whose studies for the Department of Commerce became the basis for containerized shipping and who is now a sought-after management consultant in White Plains, N.Y. Mead asked ADL to make use of Jerome S. Rubin, a lawyer who had sat in on an early meeting on Data Corp.'s incipient legal research, as a consultant.

The study report found that Data Corp.'s Recon central system was inferior to competing automated legal research systems that were also inadequate. An ultimately profitable market existed for a far superior data base and retrieval method that would cost between $20 million and $30 million to develop and sell. On Feb. 4, 1970, chairman McSwiney of Mead said, "We will go ahead." Mead lacked management to pursue the project and invited Wilson and Rubin to take it on. They formed a management partnership entrusted with a newly formed Mead Data Central corporation.

From 1972 on, Rubin directed concentrated imaginative labor by a team of computer and linguistic scientists. They supervised compilation of a data base that now encompasses 12.5 million pages. Federal and state laws, court decisions and much of British and French law are in full text. Nexis, a companion library of business information, contains 160 major newspapers, magazines, wire services and newsletters, the *Encyclopaedia Britannica* and now has exclusive license to the New York Times Information Service.

After taking the enterprise to more than $60 million in annual revenues and strong profits, Rubin resigned for policy reasons in late 1981. Jack W. Simpson now runs the worldwide service from Dayton, to which almost every large, solvent law firm, court, law school and government agency subscribes.

The Whitney and Greylock VC firms received 10% of the price Mead paid for Data Corp. Credit for insight belongs to McSwiney, the acquirer, and for the achievement to Rubin and his team.

According to Bob O'Hara of Mead, two printing products also resulted from Data Corp.: Direct Imaging by Jet Ink Transfer (Dijit) combines high-speed web offset with flexible computer-controlled dot-generated graphics. With 52 presses sold, it is profitable. The Admark addressing printer, heading toward black ink, eliminates mailing labels by printing directly on the substrate of a magazine or catalog.

Ahead of Schedule

Arthur D. Little (grandnephew of the founder of ADL) tells of one success whose start-up came in ahead of schedule and under budget. His public venture Narragansett Capital Corp. had vowed in February 1970, after taking a $2.244 million bath on Codata on a tax loss, never to enter another start-up. In 1968 it had $268,000 in Magnecheck, which went bankrupt. Earlier it had put $200,000 in Optron, but that firm's vibration measuring equipment for tracking missiles and space vehicles had no market.

In May 1970, Ted Moseley of Textron (started by Little's father, Royal) met two young men — James Dao and Nelson Yew — at a party. They had an idea for an improved electron scanning microscope. When Moseley sent them to Narragansett, Little says, "We didn't even know what a scanning electron microscope was." He got Harvey Paster of ADL to do a technical evaluation, which responded, "These guys are so good and so advanced we aren't even asking the right questions." Clearly, the proposed Magnetic Tech, Inc. (later renamed Etec) was to start with an advantage.

In 1970, Narragansett put in $300,000 on a straight equity deal, and the young entrepreneurs invested $75,000. They produced a prototype in six months at $250,000 cost.

Etec was profitable in a limited market that turned competitive when Hitachi Ltd. and Siemens AG entered. Dao and Yew proposed an entire new product line — lithography on the silicon substrate of semiconductor chips. At the end of 1975, Narragansett kept increasing its investment and guaranteed bank loans. By 1979 when Perkin-Elmer Co. bought Etec, the venture capitalists had paid $516,400 for stock and signed for $1.5 million in notes. Narragansett got those back in cash plus a pretax capital gain of $1,274,000.

Peter G. Imperiale, who succeeded Ken Rind as venture capital director for Xerox, pinpoints a failure from his years with the A.G. Becker venture capital arm. A company built an optical system for digital quantitative analysis of smokestack gases. Sales fluctuated with the rigor of Environmental Protection Agency enforcement. The investor saw that the same data could be used for process control. Reducing fuel by 1% for a large utility can save $10 million a year.

But prospects were wary about buying $750,000 to $1 million systems from a firm doing only $2 million to $3 million annually. The board urged the president to co-bid with or sell OEM to companies like Foster Wheeler and Combustion Engineering, but he was sure he could go it alone. His firm slipped sidewise for years and had to be sold "because it just couldn't make any money."

Imperiale believes that MIS directors should read the *Venture Capital Journal* as a source of early warnings on trends in software, peripherals and what key management personnel are leaving established companies to form new ventures.

Three Start-Ups

Oak and Hambros International Venture Fund joined six founders in launching Telematics International, led by President John P. Pitt, incorporated in March 1982 with $2,051,500 in capital. The object of this Tamarac, Fla., company is to offer a computer communications system in the $15,000 to $200,000 price range that has markedly higher performance than computers now on the market.

Pitt and his colleagues plan a minicomputer whose recovery from failures or errors makes it a system suited for high-availability applications. A second series will extend resident system architecture into fault-tolerant configuration. A third will use a 32-bit processor for disk-based virtual operation in a single system.

The company's Series 1 features a proprietary 32-bit internal bus that central processors, memory units and I/O processor share Up to eight units yield an effective bandwidth of 32 million bytes per second.

Telematics regards its entry as timely because of digital technology that mixes data and voice in one transmission, the increase in microwave and satellite links for communication between computers, the rise in such dissemination systems as viewdata and teletext and the upsurge in local-area networks.

Mark Leslie, president of Synapse Computer Corp. of Milpitas, Calif., says he did not know what to expect from what he'd been told were "vulture capitalists." After three rounds of venture financing that totaled $14 million by Synapse's August 1982 announcement of its first product, he reported that investors had thus far consistently proved technically and commercially sophisticated and very supportive, considerate, patient and sensitive to management resolve to maintain maximum equity as well.

The first round obtained $1,625,000 by November 1980, followed by another $6 million in May 1981. Among investors are Jesse Aweida of Storage Technology Corp.; Bessemer Venture Capital; Eastech Associates, Boston; Hambrecht & Quist; Interwest Partners from its second $30-million fund and Sevin Rosen Partners of Dallas and New York. In June 1982, another $5.9 million came in from J.F. Shea & Co., the Sharjah Group, Morgan Stanley, the Stanford endowment and the University of Rochester's University Ventures.

Synapse processors move data to and from common shared memory at 64M bytes per second, with a spare processor taking over in case of breakdown. With these processors' ability to handle enormous data bases and numerous transactions at once, Link Resources Corp. has suggested that Synapse may have built "the ultimate videotex machine."

A data base can conceivably hold 150G bytes. The system can manage 40 or 50 simple transactions per second, or 20 more complex ones per second.

Apollo's Birth

When Dr. John William Poduska, founder and former R&D vice-president at Prime Computer, formed Apollo Computer, he had what he was sure was a compelling and timely idea. When he put together a management team consisting of six co-founders, experienced venturers on his board arranged start-up money and helped get a multicurrency revolving line of credit for up to $10 million.

The idea is to offer a local-area data network system that has virtual memory processing power distributed throughout. Apollo incorporated in February 1980 when it began developing its Distributed Operating Multi-Access Interactive Network (Domain) processing system. Although Digital and Prime sell local-area networks connecting superminis, Apollo's architecture was the first permitting networkwide transparency.

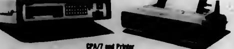
Apollo became profitable in the third quarter of 1982 by virtue of sales that rose to $4,812,000 for that period. Financing came from a series of preferred stock sales. In April 1980, Sutter Hill Ventures of San Francisco, Hellman, Ferri Investment Associates of Boston and the Rockefellers' Venrock Associates bought more than 6.4 million shares at 20 cents each. Subsequent sales were priced at $1, $5 and $6.

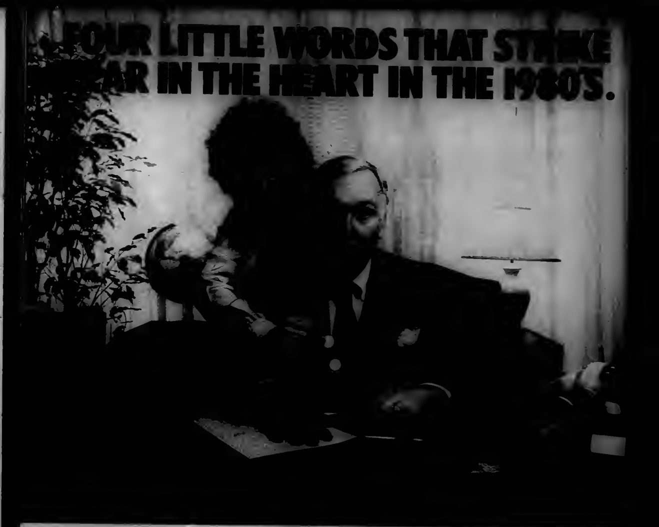
In March 1983, Morgan Stanley & Co. and Hambrecht & Quist led underwriters when Apollo went public, selling 4.4 million shares at $22 each, two million from Apollo and the rest from selling shareholders. At this writing, the price is $44¾.

VC Comers

Euan Malcolmson was with Fort Hill Investors in Boston when he decided that too much of his time was going into finding money rather than helping manage new ventures. His Chatham Venture Corp. of Needham, Mass., now advises the $20 million Japhet U.S. Venture Capital Fund Ltd., assembled by the London merchant bank Charterhouse Japhet Ltd.

Chatham's vice-president is Stephen J. Gaal. He directed software development for Data General Corp. soon after its inception and worked at Bell Laboratories. Chatham has




FOUR LITTLE WORDS THAT STRIKE FEAR IN THE HEART IN THE 1980'S.

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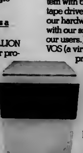

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Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. $140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing...

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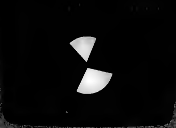

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SAS/GRAPH

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In short, the SAS System gives you the analytical tools for a complete Decision Support System—integrating modeling, statistical manipulation, graphics and multiple data sources.

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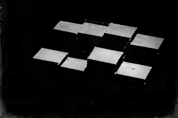
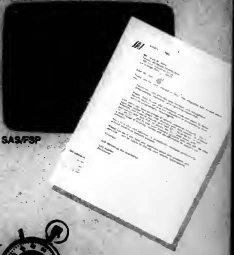




ventured into three areas that should interest MIS people.

- Victor Technologies, Inc. is the 16-bit micro maker that Charles Peddle, Christopher Fish and John Paivinin bought from Kidde. The company will supply Microsoft DOS and a 16-bit version of Digital Research, Inc. CP/M software at no extra cost. It will soon go public,
- Microcom, which James Dow launched in November 1980 with $40,000 of his own, received $400,000 with help from Malcolmson when he was with Fort Hill and became profitable by the end of 1981. Its error-connecting modem retransmits data transparently between personal computers and mainframes and other personal computers in accord with the International Standards Organization (ISO) open system interconnection layers, permitting access through any dial-up public network. Its modems with protocol built in are promoted as ideal for transmitting telesoftware.
- VMX (formerly ECS Telecommunications) is Dal Berry's answer to "telephone tag." This Richardson, Texas, firm sells voice message exchanges that control up to 3,000 disk recording voice mailboxes that any Touch-Tone phone can reach.

Bruce W. Shewmaker, former Time, Inc. investment director and executive with Diebold Venture Corp. and Chase Manhattan's SBIC, is one of four Merrill Lynch venture partners. Merrill Lynch collected $60 million from 6,800 limited partners, having written a $10 million check for the managing partners to start investing 2½ months before the financing and paperwork were done.

Shewmaker is confident that publicly held venture capital firms will become more common. Chairman is George Kokkinakis. In nine years as venture capital adviser to Exxon Enterprises, he was start-up investor in Qume, Ramtek and Zilog. Another vice-president is George L. Sing, who had been with Exxon Enterprises and Cresap, McCormick & Paget. Kokkinakis and Sing had also been general partners at Advanced Technology Ventures headed by T.F. Walkowicz. They already look toward ML Venture Partners II.

MIS, VC Parallels

Fortune 1000 MIS directors have in common with VC specialists their uses of high tech to observe the old rule that "you work for who pays you." At their most effective, MIS managers strengthen managements' ability to make sound decisions and to monitor them, particularly when crucial results diverge from projected aims. So do those venture capital lead investors who serve on boards of developing enterprises.

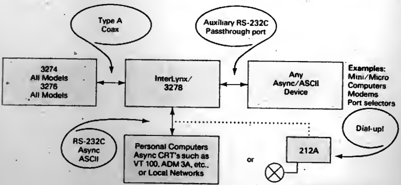
Staying with a venture over the long-term often means the venture capital people earn their money. Exiting enables their limited partners to get the payoffs sought within the seven- to 10-year time frame. High returns make up for losses when some ventures must be liquidated.

Just as MIS staffs' loyalty is to their corporations, the venture capitalists' loyalty is to the partnerships whose capital they use and to the corporations in which they invest, through thick and thin.

About the Authors

Henry and Elizabeth Urrows are a writing team based in Ridgefield, Conn.

The Urrows write principally on science for general readers. Their work includes articles for Infoworld, Microcomputing, Creative Computing *and* Popular Computing.


Type A Coax
Auxiliary RS-232C Passthrough port
3274 All Models 3276 All Models
InterLynx/3278
Any Async/ASCII Device
Examples: Mini/Micro Computers Modems Port selectors
Dial-up!
RS-232C Async ASCII
Personal Computers Async CRT's such as VT 100, ADM 3A, etc., or Local Networks
or
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Folded, Spindled and Mutilated

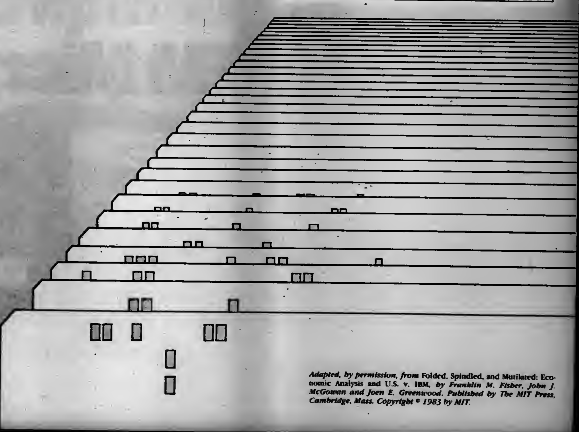
Where the Case Against IBM Went Wrong

By Franklin M. Fisher
John J. McGowan
Joen E. Greenwood

In some ways, *U.S. vs. IBM* was one of the great single-firm monopoly cases of all time, certainly in terms of time and resources expended. Brought in January 1969 in the waning hours of the Johnson administration, it went to trial in 1975. The trial on liability lasted for more than six years (with the case on relief, if any, still to be tried). The trial transcript contained more than 104,400 pages, and thousands of documents were placed in the record. In addition, there were several large private suits that prompted changes in the case, not to mention investigations and actions in the European Economic Community.

The computer industry was perhaps the most technologically progressive industry in the U.S. economy; certainly it was one of the fastest growing industries and of central economic importance. IBM was the best known and obviously the largest company in the industry; its computers were widely used.

It may thus have appeared a shocking anticlimax when William F. Baxter, the assistant attorney general in charge of the Antitrust Division in the Reagan administration, agreed in January 1982 to a complete dismissal of the case, stipulating that it was "without merit." How could this happen? Was it "political"? What had been happening all



Adapted, by permission, from Folded, Spindled, and Mutilated: Economic Analysis and U.S. v. IBM, *by Franklin M. Fisher, John J. McGowan and Joen E. Greenwood. Published by The MIT Press, Cambridge, Mass. Copyright © 1983 by MIT.*

those years? Were the antitrust laws, as at least one commentator suggested, simply obsolete — ill-equipped to deal with the economics of modern industry?

This article, derived from Franklin M. Fisher's testimony as an expert witness for IBM, considers the case and provides answers from the point of view of economic analysis. We take the position that, at least as far as single-firm monopoly cases are concerned, the antitrust laws are not obsolete; judicial interpretations of them are consonant with sound economic analysis of competition and monopoly. The disaster of the IBM case came about in part because the government's economic analysis was not sound. We believe that when the assistant attorney general stipulated that the government's case was "without merit," he did so for a very simple reason: it was.

IBM's Actions

Whatever view of the market one takes, it is apparent that IBM is the largest firm in it. The question of what actions such a firm can take to preserve its position is an important one for antitrust policy.

Anticompetitive conduct must differ from action that would be expected to occur under competition. It follows that not every action that "damages" competitors is anticompetitive. In a competitive market, less efficient, less responsive, less innovative competitors will always suffer.

In particular, firms facing the prospect of lost business are expected to cut prices in order to acquire business if it will increase their profits. Some or all of the business so acquired might otherwise have gone to competitors. Yet, such price cuts are not anticompetitive, even though less efficient firms might be forced to give up profits in order to match the new prices or even go out of business because they cannot match those prices profitably.

Expected Behavior

Note that this analysis is unaffected by the price cutter's awareness that lowering price may drive out particular competitors. All firms intend one result of their competitive acts to be the acquisition of business that otherwise would have gone to their rivals. Nevertheless, when they are forced to reduce price in order to avoid losing business and profits, their actions in the face of such threats are precisely the behavior that competition is expected to cause. Such actions should not be treated as anticompetitive.

Similarly, the design and introduction of new, profitable products is not anticompetitive just because it inconveniences particular competitors. Ultimately, the marketplace will decide if there is benefit to a design choice, especially where the new product offers an additional option. The provision of new and better products, like the lowering of prices, often injures competitors in the sense that it deprives them of business, which is its purpose under competition.

Anticompetitive conduct

is conduct that makes no sense without the monopoly profits that can be made only after competition is reduced or driven out by the monopolistic reduction of output or of output quality to achieve unjustifiably high prices. Conduct that brings profitable higher sales cannot be anticompetitive regardless of how uncomfortable it makes competitors.

The following conditions must be present to find that a firm's conduct is anticompetitive:

First, the conduct must be other than that encouraged by and consistent with the competitive process. The subjective intent of a company is difficult to determine and will usually reflect nothing more than a determination to win all possible business from rivals — a determination consistent with competition.

Second, the conduct must also be substantially related to the maintenance or acquisition (or attempted acquisition) of monopoly power, in that it must have (or be expected to have) the effect of destroying or excluding competition.

Necessary for Competition

The first prong of this test is a matter of necessity if aggressive competition is to be encouraged. The inherent uncertainty of a rule that would require businesses to respond to competitive stimuli subject to the later judgments of others that the responses were too much or too little would have an inevitable dampening effect on competition.

Activities such as lowering prices (if not below cost, as explained later), introduction of better products, dissemination of pricing and product information and adoption of improved design concepts or more efficient means of production are incidents of the competitive process that benefit customers.

To premise their legality on an inquiry into the specific motivations or subjective intent of the firms that engage in such conduct (when it is clear that all firms engaged in competition attempt and intend to win as much business as they can) or on retrospective evaluation of whether there were more "desirable" alternative actions that could have been chosen, would be to elevate competitors above competi-

tion and threaten the entire competitive process for the sake of those who are not intended to be its beneficiaries and at the expense of those who are.

The reason for the second prong of the test is self-evident: if the act is ineffectual (and expected to be so), it is irrelevant, except perhaps as a proof of lack of monopoly power on the part of the actor.

Since the first prong of the test may be difficult to apply, it is well to be aware that failure to pass the second is dispositive.

Predatory Pricing, Limit Pricing

A predatory price is a nonremunerative price set in a deliberate attempt to drive out or discourage actual or potential competitors. The firm that sets such a price is undertaking a deliberate loss in order to earn monopoly profits once competitors have been eliminated. In this sense, predatory pricing is consistent with long-run profit maximization. But without the prospect of future monopoly profits from subsequent price increases, which will more than make up for initial losses, "predation" is an activity that would not be undertaken by a rational, profit-maximizing firm.

Consider a firm that makes an innovation by discovering a new product. During the period after the discovery and before others learn how to make that product, the innovating firm may earn high profits. When imitators enter and begin to produce the same or similar products, they may be able to offer those products at lower prices, since they can learn from the innovator's experience and thus avoid incurring the same research and development costs. In this situation, customers will turn away from the innovating firm if it attempts to keep its price high. Faced with this circumstance, the original innovator will have to lower its price or lose business. It is the lowering of price that competitive entry is supposed to accomplish.

It may be that as the original firm is forced to lower its price, some of the imitators will no longer find it profitable to remain in the business. These will be the less efficient firms whose costs were too high to make profits except at prices near the original pre-entry price. Nevertheless, such exits do not in themselves make lowering of the price predatory. This example illustrates a fully competitive situation even if the original innovating firm consciously realizes that by lowering price it will drive out competitors. It *must* lower its price in this situation or lose business to others. Lowering the price may mean lower profits than it would earn if it could keep price up and *not* lose business, but this option is not available. In the circumstances described, profits will be greater if prices are lowered than if they are maintained, and the original firm will inevitably acquire business that would otherwise have gone to its rivals.

It follows that a predatory price must have the property that the additional revenues that flow from selling at that price are less than the additional costs incurred in order to make the sales. In the simplest case of a single unchanging good, marginal revenue must be less than marginal cost. Demand curves that do not slope up indicate that price is no greater than marginal revenue, which in return implies that a predatory price must be below marginal cost. Whether the appropriate marginal cost is short- or long-run depends on whether the firm has excess capacity.

Since marginal cost is hard to estimate, it may be necessary to use surrogates, such as average variable cost, to apply such a test in practice; the analytically correct standard ought not to be in doubt, however. For an act to be predatory, the additional revenues that stem from the act (not counting later monopoly profits) must be less than the costs that would be avoided by refraining from the act — "avoidable costs."

To take a more complex example, consider the case of a firm contemplating a new program of product development. At various decision points in the process, the firm will have incurred some costs. Such costs are sunk costs and do not enter into a profit-maximizing decision. The costs that do enter into such a decision are those that would be avoided if the firm did not go forward with the program. Similarly, certain revenues enter into a profit-maximizing decision. These revenues are what the program will bring in if it goes forward over and above the revenues the firm will receive if the program does not go forward. To be predatory, the decision to proceed in this instance must be made in the expectation that the additional revenues will not cover the avoidable costs. If the firm reasonably expects such costs to be covered, then the program is remunerative and the decision to go forward is not predatory.

The lowering of prices or the introduction of better products are two activities that competition is supposed to compel. As long as prices are set above avoidable costs, there is no waste of social resources by the firm setting such prices, and the only firms that will be unable to match them and may eventually be driven from the market are the less efficient. Competition encourages these results. Pricing below avoidable cost, on the other hand, may eliminate equally or more efficient actual or potential rivals, not just less efficient ones. It can have no legitimate purpose, for its sole justification is driving out competitors so that prices can then be raised and monopoly profits earned. Such pricing leads to an improper allocation of resources and, eventually, to higher prices. Both of these results are inconsistent with competition. They constitute anticompetitive conduct if they are not merely the result of accident or miscalculation and actually have (or are expected to have) an anticompetitive effect.

Note that in this view, a large firm, even a "dominant" firm, would be allowed to engage in "limit pricing," reducing its prices to a still remunerative level when attacked by competition in order to retain business and thus market share. *It is a mistake to believe that a large market share is equivalent to monopoly.*

When such a share can only be maintained by reducing prices toward (but not beyond) costs or introducing better products, monopoly power is absent and competition is doing its job.

It may be objected, however, that while permitting such pricing will lead to prices lower than the short-run monopoly price, it may also result in prices above the long-run competitive price. But consider the consequence of making it "anticompetitive" for a firm with monopoly power to price above the perfectly competitive equilibrium price (long-run marginal cost) but below the short-run monopoly price (where profits are maximized as though competitors would never exist). Such a policy would condemn as "predatory" price cuts that are *less* deep than others that are *not* considered predatory.

> ***'The lowering of prices or the introduction of better products are two activities that competition is supposed to compel. As long as prices are set above avoidable costs, there is no waste of social resources by the firm setting such prices . . .'***

Further, given the difficulty of deciding or proving what long-run marginal cost actually is, such a policy would in practice make firms hesitate to cut prices at all — as competition would require them to do. This policy would effectively require the firms involved to hold up an "umbrella" over entrants regardless of whether the entrants are efficient. It would thus keep innovative and efficient firms from reaping the rewards of their efficiency.

Under such a policy, an innovator would be faced with a Hobson's choice as soon as an imitator could produce the same product at a cost below the short-run monopoly price even if that cost were far above that of the original innovator. The innovating firm would either have to set its price at the short-run monopoly price, allowing the inefficient imitator to take the business, or else it would immediately have to set its price at long-run marginal cost. In either case, the original innovator would lose the fruits of the innovation.

This policy is a recipe for stifling progress by removing the incentives for pursuing it. It stands in contrast to the behavior expected under competition, where, as imitators become more efficient, the price drops to the level of *their* costs, eventually falling to the long-run marginal cost of the original firm if it remains the most efficient one, or below that level if it does not remain so.

The IBM 360 Issues. According to the government, virtually all of the System/360 computer products that IBM introduced in and after 1964 and marketed for the remainder of the 1960s were anticompetitive product introductions or "fighting machines." The entire System/360 line announced on April 7, 1964, and a number of individual System/360 products announced at different points in time thereafter were alleged to have been "premature announcements." In addition, the 360/90 series, the 360/67 and the 360/44 were alleged to have been predatory product introductions with prices deliberately set below cost. These claims reach virtually every aspect of IBM's computer business in the mid-1960s and imply that IBM should have totally restructured the conduct of its business during that period so as to delay or not to make new product announcements for some unspecified period of time. On its face, this view bespeaks a total misunderstanding of the economic analysis of competition and monopoly; after all, the introduction of new products is usually a sign of competition, not monopoly.

Pricing of 360/90

The Model 90 program begun in 1961 was the successor to a series of "super computer" development efforts that IBM had undertaken during the 1950s. Each of those programs had helped advance the state of the art in computing. The Model 90 program was an effort by IBM to "push technology" and build "the most powerful computer" possible at the time.

There were a number of reasons why such attempts to "stretch" the state of the art were undertaken by IBM, including substantial pressure from leading-edge customers; a sizable business opportunity as well as a chance to promote the nation's interest if such demands could be met; the promotional value and added sales that would result from being able to lay claim to providing the world's most powerful computer; the ability to attract the best young talent to work on such advanced projects; and the very valuable "technological fallout" that would result for future development efforts.

With the increasing publicity in 1963, devoted to Control Data Corp.'s 6600

computer system, which was announced but undelivered, IBM's industry leadership in large-scale, state-of-the-art computers was called into question. In response, IBM management attempted to determine how IBM could "catch up to and surpass CDC in the area of very high performance computer systems" and accelerated the Model 90 program (then called "Project X"). Even so, the program had not "progressed far enough to warrant a general announcement" along with the rest of the 360 series in April 1964, although a footnote to the System/360 announcement advised customers that development of the Model 90 was in progress. The Model 90s were announced in August and November 1964.

Delivery of the first of the Model 90s was made nine months late, primarily because IBM encountered unexpected problems in the Model 90 circuitry. Each of the systems, however, performed well and to customers' satisfaction and passed all government-imposed acceptance tests. Nevertheless, while the technological fallout anticipated from the program did materialize, the Model 90s were unsuccessful despite price reductions that attempted to make them more competitive. Only 15 Model 91a were manufactured (four for internal use); two Model 95s were manufactured "specially" for the National Aeronautics and Space Administration.

In the meantime, CDC manufactured more than 200 of its 6000 series computers, including 94 Model 6600/6700s. By CDC management'a own account, the 6600 was "particularly" successful, and, after the 6600 was delivered, CDC was able to "dominate" the field in large computers from 1964 to 1969. Moreover, from 1964 to 1972, CDC's revenues and gross profits from the sale and lease of 6600s exceeded CDC's targets. As IBM'a Paul Knaplund testified, "They [CDC] certainly beat us."

Nevertheless, the government contended that the 360/90 was "prematurely" announced and predatory. We postpone analysia of the prematurity issue and now consider the latter contention, that: "The IBM Model 90 series is a classic example of a fighting machine. Its primary function was to atop Control Data and eliminate the potential competitive threat that the company posed to IBM's monopolization of the marketplace."

At issue is whether IBM believed at the time of announcement that its avoidable costs on the Model 90 program would exceed the revenues that the program would return and would thus be justified only by the alleged monopoly profits to be earned after CDC was "stopped." IBM could not have expected to "stop" CDC. At the time of the announcement of the Model 92 (later replaced by the Model 95) in August 1964, the professional forecasters within IBM estimated that the potential in the U.S. for sales of computer systems of the size and power of the Model 92 was about 70. Those same forecasters projected that at the prices announced in

August 1964, IBM would install 24 Model 92 systems in the U.S., and IBM's marketing arms only committed themselves to placement of 24 such systems worldwide. It is hard to conclude that an action expected to achieve one-third of the potential business for that size system was also expected to drive CDC or any other competitor out of business. As we have seen, the CDC 6600 was in fact a remarkably successful product. CDC's EDP revenues more than tripled from 1964 to 1969, from about $150 million to about $570 million.

The pre-announcement financial analysis of the Model 92, done in accordance with IBM's standard full-cost recovery methodology, showed that IBM expected to earn profits of about $10 million on the Model 92 system as a whole, including peripheral equipment that was not otherwise expected to be sold or leased by IBM. The same analysis showed, however, that with respect to the Model 92 central processing units and memory alone, using IBM's standard full-cost recovery methodology, the company's projected cost would exceed its anticipated revenues.

That analysis did not purport to be an indication of the incremental revenues and avoidable costs associated with the Model 92 announcement. It contained as program costs of the Model 92 processing unit and memory the costs of advanced development work that IBM would have undertaken even if it had not decided to announce the Model 92 and large amounts of fixed overhead that would have been incurred even without the Model 92 program. On the other side of the equation, the analysis ignored completely the substantial "fallout" benefits to future products that could result from the advanced research and development efforts on the Model 90.

IBM was well aware that such technological benefits could be expected from the Model 90 program and that there were thus powerful reasons for undertaking it, even if accounting computations did not properly attribute such benefits to the credit side of the ledger. At just this time (1964), IBM was coming to a full realization of the technological fallout of its earlier development of Stretch, a large machine that had appeared to lose money but was now paying off first in terms of the 7090 and the 1400 series and then in terms of System/360 itself.

Thus, IBM management recognized that it was particularly inappropriate to measure the potential profitability of the Model 90 program by using IBM's usual full-cost recovery approach and looking only at the central processing unit and memory. The optimum approach would have involved quantifying and including the anticipated fallout benefits, but it was recognized within IBM that such quantification would have been "so speculative in content as to be almost meaningless."

Instead, IBM went part way toward a correct calculation by ignoring such benefits but not counting costs of development programs and other expenses that would be incurred regardless of whether the Model 90s were produced. On this basis, the central processing units (including memory) were expected to recover costs, and the systems as a whole were expected to earn profits of approximately $30 million. Subjecting the figures to intensive and conservative review years later, Sidney Davidson, Arthur Young Professor of Accounting at the University of Chicago (who was called as an IBM witness), agreed that the system was reasonably expected to be profitable on this basis.

Further, the fallout benefits cannot be ignored. They were expected on the basis of IBM's past experience to be substantial, if unquantifiable, and, in fact, they materialized. The Model 90 program produced technological benefits of use in later products, including the solution of the "cracked stripe" circuitry problem and developments in thin-film technology, monolithic circuitry, transistor technology, interconnection technology and machine organization. In addition, that program kept IBM from appearing to abandon leading-edge powerful processors, a gain in terms of its image with customers and personnel morale and

retention. Since the program as a whole was expected to be profitable even without such benefits, it must have been so with them.

At the trial, Alan McAdams took the position that one ought not to count the profits that IBM expected to earn from additional memory and I/O devices that would be attached to the Model 90 CPUs and would not otherwise be placed. He argued for the exclusion of such profits on the ground that IBM's production facilities were overloaded with a backlog of orders so that peripherals produced for Model 90 systems simply displaced *in production* peripherals for other systems.

This argument is incorrect on two counts. First, the backlog in production facilities was unforeseen when the announcement of the 360/90 was being considered. That backlog stemmed from the explosion in demand for the other models of the 360, and the Model 90s were in any case a small fraction of IBM's anticipated output. The decision to announce the Model 90s thus properly counted the additional peripherals.

Second, even putting this aside, the contention that Model-90-stimulated peripherals would not have contributed to IBM's profits is analytically incorrect. Suppose it to be true, for example, that disk drive plants were operating at full capacity and that there was a backlog of orders. Suppose further (contrary to fact) that IBM anticipated this situation in August 1964. A future order for a disk drive from a 90 series customer would only lengthen the queue for disk drive delivery — it would not (as McAdams suggested) replace another disk drive.

So, while the profits from production of a Model-90-related disk drive would not simply be additional, they would not be offset entirely or even largely by the loss of profits on another disk drive, even if the factory were badly backlogged. They would only be offset to a minor degree by the amount of interest involved in the fact that the profits from the displaced disk drive were postponed.

There are two circumstances in which this analysis would not be correct. One such circumstance would be that in which the marginal increase in waiting time consequent upon the production of the 360/90-related disk drives for customers with orders behind those drives in the queue was sufficient to cause those customers to cancel their orders. There is no evidence that anything of the kind happened, and the forecast for the 90 series was too small for it to have been expected to happen. Second, if the backlog could have been expected to be *permanent*, then the production of additional 90 series-related disk drives would have permanently increased waiting times, as the postponed disk drives postponed others and so forth. In that event, the foregone interest would indeed have a present value exactly equal to the profits from the 90 series-related disk drives. For this situation to have occurred and been relevant to IBM's decision, however, IBM would not only have had to anticipate in August 1964 the backlog that emerged a year or so later but would have to have expected that backlog to last forever or at least long enough to make the postponed interest effect more than negligible. Such farsightedness is highly improbable. The interest effects — mere matters of the timing of receipts — were certainly negligible and would sensibly have been neglected in the light of the uncertainties surrounding forecasts of this nature.

In sum, the development and announcement of the 90 series carried with it a number of quite substantial indirect economic benefits, which IBM anticipated and took into account in deciding to proceed with the program (although, of course, not in bookkeeping terms). Such a program might very well have been expected to go forward under competition, even if accounting for direct revenues and costs showed a loss. Even without consideration of such indirect benefits, however, the Model 90 program was expected to yield revenues that exceeded avoidable costs. In such circumstances, the decision to announce the 90 series could not have been predatory. Not only was the 90 series not priced below cost, but it neither drove out nor

could it have been expected to drive out CDC.

Claims of Prematurity

The government maintained that the announcements of the 360/90, 360/67, 360/44 and, indeed, the entire 360 line, were anticompetitive because they were "premature." It is not easy to state rules as to when a product announcement is premature or when such prematurity is anticompetitive. In general, there is no reason to inhibit the time when a firm announces or brings products to the marketplace. Customers will be the final arbiters of the product's quality and the firm's reputation. Broken promises and unattractive products can be expected to lead quickly to a loss of credibility and sales.

Product announcements in the computer industry involve the release of relatively formal descriptions of new products and their properties. When such formal announcements are made, prices are stated and order-taking commences. There is no doubt that IBM, like all or virtually all other firms in the market, regularly announces products in this way as much as a year or so before they are available to customers. It does so, indeed, while they are still under development. This practice is natural. Customers installing a new computer system need a substantial amount of lead time to make their decisions, plan for the changeover or for the rearrangement of their organization and prepare the site for the computer.

To announce products only when they are ready to be shipped to customers is to ensure a sizable lag between the time products are ready for customers and the time customers are ready for the product. Hence, some lag between announcement and the date of first customer shipment is required so that orders for the first part of the production run can be secured. In the presence of such good reasons for a lag between announcement and shipment, can announcement of a product not fully developed be anticompetitive?

Advance announcement of truthful information about products cannot be anticompetitive. Indeed, such announcement is procompetitive; competition thrives when information is good. To understand this point, suppose that IBM did not announce the availability of a product until first customer shipment and that competitors and customers based their plans on guesses about the products IBM would produce. When IBM actually came out with the product, those competitors and customers who had guessed wrong would be damaged.

The only question, therefore, is whether IBM made its product announcements in good faith. In announcing products not yet fully developed, IBM was making a forecast about its ability to deliver. As anyone who has ever engaged in research knows, there comes a time in any research project when one can say with some certainty what sorts of things will be available as the output of the project, even though those things are not yet fully developed. One can also forecast the time at which development will be completed. These forecasts can be made even though there remain problems not yet solved.

Of course, in making such forecasts, one is sometimes wrong. When IBM made announcements, it announced what it wished customers to believe and what it itself believed. If those announcements of its belief were made in good faith, then it was imparting information to customers and competitors as to what it expected to do. Even if it was later unable to do those things, the imparting of such information can only aid competition. Only deliberate falsehood could possibly be anticompetitive here, and that is highly improbable since a firm that practiced such tactics would acquire a tarnished reputation that would ill-serve it in the future.

Note in this regard that it is not evidence of the "prematurity" or anticompetitiveness of an announcement if, as McAdams testified, "the essential motivation for the announcement was the pressure of competitors in the market." The pressure of competitors is expected to force the introduction of new products.

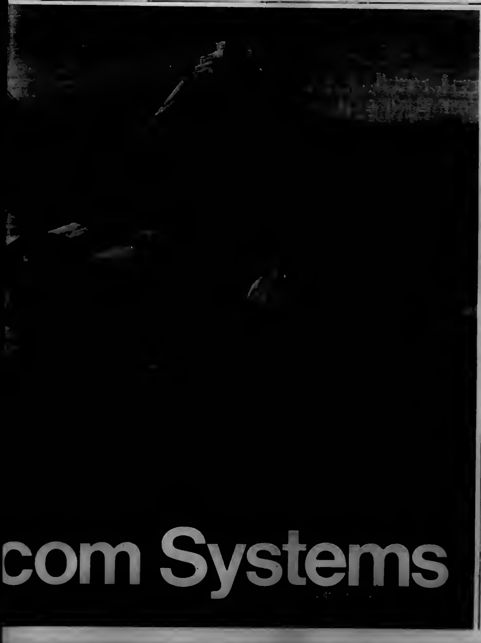
There is no doubt that IBM sometimes underestimated development difficulties — particularly for operating software, OS/360 and TSS. Some such errors, however, are an inevitable price paid for the benefit to customers and suppliers of a product announcement before development is complete. There is no reason to suppose that IBM was ever deliberately deceptive; on the contrary, it took extraordinary pains to guard against such errors. There is also no reason to suppose that failure to deliver as promised goes unpunished in the marketplace or that the trade-offs in the announcement decision should be or can be sensibly regulated by the threat of antitrust litigation.

The 370/158 and 168

On Aug. 2, 1972, IBM made several major product and programming announcements, including the 370/158 and 370/168 processors. The 370/158 and 168 processors incorporated significant technological and price/performance improvements over their immediate predecessors, the 370/155 and 165.

One of the major technological advances of the 158 and 168 was their use of advanced semiconductor memory, called field effect transistor (FET) memory. With the introduction of FET memory on the 158 and 168, IBM was able to achieve in its large processors the advantages of a single, integrated packaging technology for both logic and memory circuits, which resulted in economies in production and packaging. Furthermore, FET memory was faster, more compact and lower priced than the core memory that had been used with the 155 and 165.

The 158 and 168 were also the first IBM processors to be announced with a "virtual



memory" or "virtual storage" capability, providing users with an apparent main memory capacity substantially greater than the actual main memory capacity of their systems. This change in memory capacity was considered by IBM to be "[a] major redirection of IBM System/370 technology" expected to have "a revolutionary effect on computer users for years to come." Virtual storage could be added to the 155 and 165 processors by the acquisition of dynamic address translation (DAT) hardware for a purchase price of about $200,000.

The government contended that IBM announced the 370/158 and 168 processors two years after the 370/155 and 165 in order to make obsolete those two processors, which had been heavily purchased by leasing companies. Before coming to the main economic issues raised by this claim, there are some subsidiary points that require discussion.

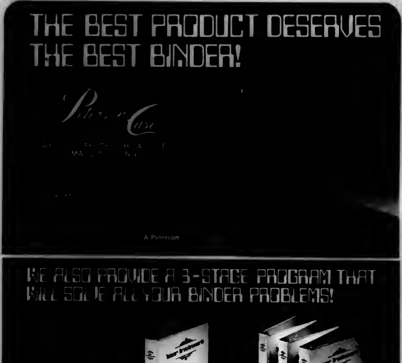
First, there is a patent inconsistency between the government's argument about the 158 and 168 and its charges relating to 370 "multipliers." If leasing companies were precluded by the 370 multipliers from purchasing 155s and 165s, then they could not have been hurt by the alleged premature obsolescence of those machines.

Second, the claim that after the 158 and 168 announcement leasing companies were stuck with prematurely obsolete 155s and 165s is at odds with the facts of leasing companies' purchases of those machines. After 1972, leasing companies purchased directly and indirectly almost $115 million of 155 and 165 CPUs and memory — more than the amount of 155 and 165 CPUs and memory purchased by leasing companies during the period 1970 through 1972. Moreover, there is no evidence that any leasing company wrote down the carrying value of its 155s and 165s. It is strange conduct indeed for companies that supposedly had just been "trapped" with unmarketable products to purchase more of those unmarketable products and to purchase them in greater quantities than they had before. IBM's own profit projections for the 155 and 165 as of the announcement of the 158 and 168 indicated continuing profitability.

Third, the claim that IBM's failure to inform customers of the 155 and 165 about its not-yet-ready 158 and 168 was anticompetitive is at odds with the government's other claims about premature announcement. In this connection, it is interesting to note that the complaint in *U.S. v. IBM* with its premature announcement claims had already been filed when the 370/155 and 165 were announced — an event hardly conducive to the early announcement of information about still somewhat distant products.

The government's claims concerning the 158 and 168 are inconsistent in other respects as well. The claim that leasing companies that owned 155s or 165s suffered losses because of the announcement of the 158 and 168 is inconsistent with the other claim that the 370/158 and 370/168 processors had their prices *raised* above the prices for the 370/155 and 370/165, respectively, in order to "offset IBM's price reductions on the memory products sold separately." If such price increases had not been matched by performance increases (and, if they were so matched, they are not properly considered price increases at all), then leasing companies and other owners of 370/155s and 165s would have experienced a *gain* from the 370/158 and 168 announcement. Even accepting the claim that the August 1972 announcement caused a loss to owners of 370/155s and 165s, however, the conclusion is the same. The loss was one experienced by *all* owners of 155s and 165s, not merely by leasing companies. Moreover, the risk of such a loss — caused by the appearance of new and better products that make previously purchased products obsolete — is precisely the kind of risk accepted by all purchasers of all products. They purchase rather than lease when they believe that the relative prices of purchasing and leasing make the advantage of purchasing sufficient to enable them to take that risk.

As with any undertaking that


THE BEST PRODUCT DESERVES THE BEST BINDER!
A Peterson
WE ALSO PROVIDE A 3-STAGE PROGRAM THAT WILL SOLVE ALL YOUR BINDER PROBLEMS!
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involves risk, outcomes can vary. Events can occur in the future that either make the risk worth taking or cause the risk to mature and thereby result in loss. Thus, if purchasers of the 370/155 and 165 correctly anticipated what would happen to their products in terms of obsolescence, then they got exactly what they bargained for. *Even if they did not anticipate what would happen, however, they still got exactly what they bargained for.* The risk that the 155 and 165 — or any product — would become obsolete more rapidly than expected was a risk inherent in the decision to purchase or lease and was a risk that any purchaser necessarily takes when deciding to purchase. When products become obsolete more slowly than purchasers anticipate on the average, purchasers receive a gain; when products become obsolete faster than purchasers anticipate on the average, purchasers suffer a loss.

In short, what happened was consistent with the way a competitive market works. IBM was forced by competition to introduce the 370/155 and 165 in mid-1970. Had it not done so, it would have lost business to competitors. IBM offered the 155 and 165 for both lease and purchase. On leased machines, IBM itself took the risk of technological obsolescence; on purchased machines, the purchaser took that risk. Leasing companies, in this regard, were no different from any other purchaser.

Peripherals, Memory

In the 1960s, IBM encountered severe competition in its System/360 peripheral and memory products even before those products were delivered. In memory, disk storage and tape storage as well as other devices, the technological leads and price advantages IBM held came under mounting attack as competitive systems manufacturers matched or copied IBM's innovations. Beginning even before the initial 360 shipments were made, IBM, pressed by that competition, introduced in 1964 and 1965 several price reductions and product improvements.

In the mid-1960s, in addition to competition in peripherals and memory from its systems competitors and leasing competitors, IBM also began encountering competition for the very same equipment from plug-compatible manufacturers (PCMs). These companies began marketing individual peripherals and memory products directly to IBM end users as alternatives to the products IBM was marketing for use with its 360 processors and other 360 equipment. By 1970, multivendor systems were very common.

The growing peripheral and memory competition from systems manufacturers and PCMs posed important competitive challenges to IBM. Well over one-half of "systems" are made up of peripherals. Significant losses in peripherals business, as well as in memory, mean potential losses of more than half of a systems manufacturer's business. Moreover, the price/performance of peripherals and memory in large measure determines the price/performance competitiveness of the systems that use them; thus, success in systems placement depends on the attractiveness of peripherals.

As a result, IBM continued after 1965 to improve the price/performance of its peripherals products. Those efforts continued throughout the 1960s and 1970s. The results of those efforts were remarkable price and performance improvements in peripherals and memory, including disk storage capacity improvements from about 26 million bytes per disk spindle on the 2314 (1965) to about 1.3 billion on the IBM 3380 (1980); reduction in the cost of disk storage to the point that $1 of disk storage rental in 1980 (unadjusted for inflation) brought storage of about 1.2 million bytes, compared with 38,000 bytes in the 2314 days; reduction in the prices of memory to the point where one megabyte of memory cost $15,000 to purchase (1980), compared with purchase prices of about $230,000 on System/370 processors — and the newer memories took only a fraction of the space the older ones did.

The Antitrust Division focused on the years 1968-1972 and identified certain product and pricing actions taken by IBM which it said were engaged in "for the purpose or with the effect of restraining or attempting to restrain competitors from entering, remaining or expanding in one or more of the [PCM] markets or submarkets." These actions — added to the government's complaint after IBM's 1973 loss at the district court level in *Telex v. IBM* and not removed after that decision was reversed in January 1975 — *all* involved lower prices or better products. That alone should make one suspect that competition is being confused with monopoly.

That suspicion is reinforced when one realizes that IBM's EDP revenue in the years involved grew more slowly than that of its competitors and was essentially flat from 1968 to 1972, while competitors' revenues almost doubled. The PCMs in particular grew substantially both then and later.

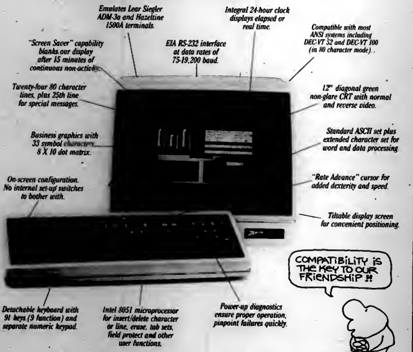
Alleged Practices: Conclusion

None of the actions that the government contended were predatory was anything of the kind. Each of them was expected to be profitable — taking proper account of additional revenues and avoidable costs. None of them was followed by the rise in prices to a monopolistic level that is the *sine qua non* of predation. None of them came close to driving out competitors. On the contrary, IBM's actions were not only consistent with competition, they were generally compelled by it.

Monopoly profits are earned through high prices and inferior products. The notion that acts showing a pattern of lower prices and better products are the behavior of a monopolist is a confusion of the workings of competition with its opposite — monopoly. Only a confusion of high market share with monopoly power, of the competitive desire to gain business with the intent to monopolize and of protection of competitors with protection of competition would require even a dominant firm to refrain from such actions.

Of course, it is possible that — considering long-run equilibrium positions only — society would be better off if a dominant firm did not reduce prices and introduce better products as competition increased. This *might*, under rather special circumstances, result in a long-run equilibrium with more firms and lower prices than if the dominant firm were allowed to compete. Yet the belief in such an outcome is at best speculative and one that loses sight of the importance of dynamic behavior.

Moreover, the behavior on the part of the dominant firm that might bring it about cannot easily be codified as part of a procompetitive policy. Such a policy encourages firms to react to competition by competing. If that reaction is fair in the sense that it meets the test discussed earlier, then competition is doing its job. It is a major mistake to confuse competition with predation.‡


Emulates Lear Siegler ADM-3a and Hazeltine 1500A terminals.
Integral 24-hour clock displays elapsed or real time.
Compatible with most ANSI systems including DEC-VT 52 and DEC-VT 100 (in 80 character mode).
"Screen Saver" capability blanks our display after 15 minutes of continuous non-activity.
EIA RS-232 interface at data rates of 75-19,200 baud.
Twenty-four 80 character lines, plus 25th line for special messages.
12" diagonal green non-glare CRT with normal and reverse video.
Business graphics with 33 symbol characters, 8 X 10 dot matrix.
Standard ASCII set plus extended character set for word and data processing
On-screen configuration. No internal set-up switches to bother with.
"Rate Advance" cursor for added dexterity and speed.
Tiltable display screen for convenient positioning.
COMPATIBILITY IS THE KEY TO OUR FRIENDSHIP !!
Detachable keyboard with 91 keys (9 function) and separate numeric keypad.
Intel 8051 microprocessor for insert/delete character or line, erase, tab sets, field protect and other user functions.
Power-up diagnostics ensure proper operation, pinpoint failures quickly.

For Large Organization Users

High-Speed, Broadband Local Net Out

By Bob Johnson
CW New York Bureau

NEW YORK — A high-speed, broadband local-area network, designed primarily for large organization users, was introduced by Interactive Systems/3M Corp. here last week.

Called Videodata LAN/1, the system uses microprocessor-based network interface units to connect electronic communications devices to a broadband coaxial cable network. The network interface units are available in two-port, four-port and eight-port versions. They handle data packet formatting, port contention and transmission acknowledgment, the vendor said.

LAN/1 uses a token-passing protocol for traffic control. Individual network interface units capture the circulating token for a present time slot, during which data packets are transmitted. While the LAN/1 is a broadband system, it operates as a logical ring or circular message network.

The system can support up to 10,000 users on five channel pairs — 2,000 on each channel pair — with network data rates of up to 2.5M bit/sec. It also supports asynchronous and synchronous devices at 300 bit/sec, with maximum terminal data rate to 19.2K bit/sec without extra modems, complex switching or computer control.

The company claimed that LAN/1's token-passing protocol guarantees network performance under all loading conditions because it allows shared access between all users and also acknowledges that transmission reception has been accomplished. Because of distributed intelligence in each network interface unit, the vendor said, the LAN/1 system does not require a head-end computer for communications control. The only control device external to the interface unit is a channel converter that remodulates transmitted signals and converts them to a higher frequency for retransmission and reception. All signals on the network are passed through the channel converter, and redundant circuitry in this device ensures uninterrupted performance, according to the company.

An optional network monitor unit, which records and updates statistics on

(Continued on Page 72)

Controller Module Provides Link Between S100 Bus, Arcnet

HAUPPAUGE, N.Y. — Standard Microsystems Corp. has introduced the Arcs100 local-area network controller module, said to provide the user with a simplified interface between the S100 (IEEE-969) Bus and a Datapoint Corp. Arcnet modified token-passing local-area network.

The controller module also provides complete control for the local-area network, resulting in virtually user-transparent network operation and control, the vendor said.

The Arcs100 module incorporates Standard Microsystems' single-chip COM 9026 local-area network controller very large-scale integrated circuit to provide complete Arcnet protocol handling on a single S100 board, according to a vendor spokesman.

The COM 9026 is said to replace over 100 small- and medium-scale circuits with a single chip to reduce network node cost while increasing performance and reliability.

The controller module reportedly will support up to 255 nodes per network segment while running at a high-performance 2.5M bit/sec data rate. Also, the product is compatible with the Arcnet baseband coaxial transmission network, the spokesman said.

Arcs100 costs $535 from Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Racal-Milgo Encryption Device Protects Circuit-Switched Nets

MIAMI — Racal-Milgo, Inc. has introduced an encryption device designed to safeguard data on circuit-switched networks. The latest addition to the Datacryptor II series, Dial-Up Datacryptor II reportedly operates in half- or full-duplex modes, synchronously or asynchronously, and at data rates up to 9.6K bit/sec.

The device features several encryption innovations for dial-up use, foremost of which is its ability to create and downline load new session keys for each modem connection. When the modems disconnect at the session's end, the device reportedly erases the key at both ends of the link.

Dial-Up Datacryptor II is available in three models: the 3400, a central unit; and Models 3500 and 3600, remote units. Each of the models reportedly can establish a session with any other provided that they share the same master key and generate and downline the session keys. Only the Model 3400 can generate master keys.

Standard features include its capability to serve networks designed to accommodate an unlimited number of terminals, the ability to support multiple encryptors on a rotary and the ability to function on secured or unsecured ports.

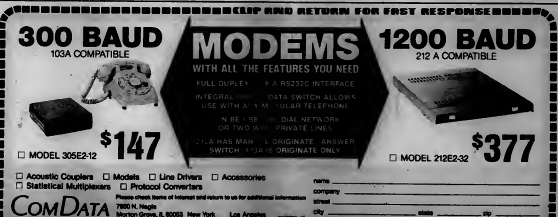
The base price for Dial-Up Cryptor II starts at $2,300. Racal-Milgo is located at 8600 N.W. 41st St., P.O. Box 520399, Miami, Fla. 33152.

Synchronous Modems Unveiled

RESEARCH TRIANGLE PARK, N.C. — Network Products, Inc. has announced two synchronous modems designed for full-duplex, point-to-point applications.

The NP-96 is a 9,600 bit/sec, V.29-compatible modem said to perform over a wide range of line conditions. The NP-48 is the 4,800 bit/sec version of the NP-96.

The NP-96 costs $2,750, and the NP-48 costs $1,800. Network Products can be reached through P.O. Box 13239, Research Triangle Park, N.C. 27709.



Permits Electronic Mail

Focus Systems Get Switched Access

ANAHEIM, Calif. — American Telecom, Inc. has announced high-speed, nonblocking, data-switching capabilities for its Focus I/II/III and Focus Elite digital private automatic branch exchange systems.

Switched access from data terminals to multiple resources, such as computers and public networks, reportedly will permit Focus systems to offer future advanced office automation applications, including electronic mail, message centers and advanced calling services, the vendor said.

The new capability utilizes existing Focus network ports, replacing voice circuits on a one-for-one basis. It can be added to any previously installed Focus system.

The data port is designed for up to 200K bit/sec transmission. Simultaneous voice and data transmission takes place over two-pair office wiring with asynchronous data rates up to 19.2K bit/sec and synchronous rates up to 56K bit/sec.

The feature will be priced at less than $700 per data connection, with first shipments scheduled for the first quarter of 1984. The vendor is located at 3190 Mira Loma Ave., Anaheim, Calif. 92806.

Envax Co-Processor Released For Micros, Word Processors

IRVING, Texas — Envax Systems, Inc. has announced a communications co-processor said to enhance the usefulness and capability of personal computers and word processors. The Envax 600 series was designed to handle communications, taking overhead away from the personal computer or word processors.

Any document prepared on a micro or word processor can be transmitted via Envax over any network, the vendor said. Messages can be programmed for transmission at a later date and be received and recorded without interrupting word processing or computer functions.

Features include automatic transmission and answering, automatic retry, battery backup and access to Telex, TWX, Direct Distance Dialing, Western Union, Inc.'s Infomaster and Easylink and private networks.

The Envax 600 series starts at $1,195, Envax said from 3330 Stovall, Irving, Texas 75061.

Local-Area Mux Unleashed

RESEARCH TRIANGLE PARK, N.C. — A local-area multiplexer said to provide a means of communicating up to eight full-duplex asynchronous or synchronous lines over two twisted-pair cables has been announced by Network Products, Inc.

Localmux, a combination multiplexer and short-haul modem, is said to be useful within a single building or in a campus environment because it reportedly can reduce the number of required terminal cables.

With 24-gauge, twisted-pair wire at a terminal rate of 19.2 bit/sec, the range is typically up to 5,000 feet, the vendor said.

Localmux is said to support up to eight terminal ports at any data rate up to 19.2 bit/sec asynchronous or 4,800-, 9,600-, 19.2- or 38.4K bit/sec synchronous.

Localmux costs $850, and the vendor can be reached through P.O. Box 13239, Research Triangle Park, N.C. 27709.

Plessey Unveils Voice System

IRVINE, Calif. — A voice recognition unit has been introduced by Plessey Peripheral Systems, Inc.

The single circuit board PVRT-300 may be used to upgrade installed Plessey PT-100B, Digital Equipment Corp. VT100 or C. Itoh Electronics, Inc. CIT-101 terminals or as an addition to a new Plessey PT-100B.

With a 90-day warranty, the unit costs under $1,300; combined with the PT-100B, it costs under $2,700 from the firm's Distributor Products Division, 2632 Du Bridge Ave., Irvine, Calif. 92714.

3M Announces Local-Area Net

(Continued from Page 71)

network operation, is available for the LAN/1, the vendor said. Data from the monitor can be used to optimize system performance and facilitate routine maintenance and troubleshooting. The network monitor unit consists of an IBM Personal Computer with Interactive Systems/3M software connected to the network via a standard network interface unit. The Personal Computer can also serve as a user terminal.

The network interface units are priced at $1,400, $2,100 and $3,200 for the two-port, four-port and eight-port units, respectively. The system's channel converter costs $2,285. Connection costs per user range between $300 and $350. The optional network monitor unit is priced at $5,700 without the IBM Personal Computer. First shipments are expected in July. More information is available from Interactive Systems/3M, Department BC83-121, P.O. Box 33600, St. Paul, Minnesota 55133.

Your people can't work together

When you bring Digital's computers into your company, your people will never work in the dark again.

Because Digital gives you computers specifically designed to work with each other. And with computers made by other manufacturers.

Now professionals can work closer together no matter how far apart they are. No matter what type of business you're in. Or where your different facilities are located. With Digital's help, you can have a company-wide computer network all your people can use.

Now professionals working in branch offices, on factory floors, at corporate headquarters can think together. Work together. Sharing information they need to solve problems faster and better than ever before.

MARKET PROJECTIONS

For Compupro Systems Users

Telecommunications Program Out

SAN LEANDRO, Calif. — Gifford Computer Systems (GCS) has unveiled a telecommunications program said lo enable users of Compupro Systems, Inc. multiuser systems to communicate with external computers while simultaneously running 8- and 16-bit applications.

Modem 8-16 reportedly permits bidirectional file transfer and asynchronous communications via modems or RS-232 interfaces between any terminal and another mainframe, minicomputer or Digital Research, Inc.'s CP/M- and MP/M-based systems. The program can support as many as six modems simultaneously.

The Modem 8-16 is said to be the first telecommunications programming language developed for any computer. The program requires a Compupro System 816 computer with 192K bytes of random-access memory and an RS-232 line or a 300 or 1,200 bit/sec modem and Version 2F of MP/M 8-16.

Suggested retail price is $295, GCS said from 1922 Republic Ave., San Leandro, Calif. 94577.

Unit Allows Modemless Connection

NORWALK, Conn. — Datacomm Management Sciences, Inc. (DMS) has announced a modem eliminator said to allow interconnection of data terminal equipment without the need for modems in applications such as IBM's Teleprocessing Network Simulation (TPNS) program.

The ME-31 modem eliminator reportedly regenerates data and clock interface signals so that a full 50-ft interface cable may be used at each RS-232 terminal interface. The unit supplies Data Set Ready to both terminal devices and presents Carrier Detect to either terminal when the other terminal'a Request-to-Send lead is activated.

In synchronous applications, the ME-31 generates highly accurate send and receive clock signals used by both terminals, the vendor said. Operable at strap-selectable rates of 1,200, 2,400, 4,800, 9,600 and 12.2K bit/sec, the ME-31 is available in rack-mounted, multichannel or stand-alone configurations. List price is $325, DMS said from 25 Van Zant St., E. Norwalk, Conn. 0685S.

Source Guide Announced

MADISON, N.J. — Carnegie Press has announced the publication of a reference guide designed for managers with a basic understanding of the concepts of data communications.

"Data Communications: Terms, Concepts, Definitions," by Daniel Farkas, is said to provide a reference to commonly used terms, expressions and abbreviations in data communications. The guide contains terms commonly used in the data communications field, followed by an alphabetical glossary.

The loose-leaf bound guide sells for $39.9S from Carnegie Press, 100 Kings Road, Madison, N.J. 07940.

Mux Extends RS-232C Potential

GAITHERSBURG, Md. — Optelecom, Inc. has announced a high-capacity, fiber-optic multiplexer said to extend the capabilities of RS-232C communications.

The Model 5100 Fiber Optic Communication System reportedly uses time division multiplexing to send data through a mile of optical cable. Sixty-four discrete RS-232C signals can be input into the Model 5100 and assigned unique address and time slots. Information from each channel is transmitted through an optical fiber where it is reconstructed into standard RS-232C voltages at a receiving end up to a mile away.

Thirty-two full-duplex channels can operate asynchronously to 19.2K bit/sec or synchronously to 38.4K bit/sec at six selectable clock rates, the vendor said. The remaining 32 channels can be used for low-speed asynchronous data (300 bit/sec) or as control signal lines, a vendor spokesman said.

The Model 5100 is mounted in a 19-in. rack with an optional console-style cabinet. Prices begin at $3,227.50 for a four-channel version. A 32-channel version costs $6,460.

Optelecom is located at 15940 Luanne Drive, Gaithersburg, Md. 20877.

Sytek Introduces Unit To Provide Net Security

MOUNTAIN VIEW, Calif. — Sytek, Inc. has unveiled an encrypted packet communications unit said to secure networks from eavesdropping or data tampering and to configure secure subnetworks on the same network.

The Z01 Option to Sytek's Localnet Model 20/100 broadband local-area network reportedly provides security between packet communications units on the Localnet network. It encrypts data between any two secure packet communications units while data is transmitted on the network, the vendor said.

The Z01 option is priced at $500 from Sytek, 1225 Charleston Road, Mountain View, Calif. 94043.

'Screenform' Enhanced For IBM TSO Users

SUNNYVALE, Calif. — Boole & Babbage, Inc. announced enhancements to Screenform, a full screen applications development aid for the interactive creation and maintenance of complex IBM IMS, TSO and CICS screen formats.

Screenform Release 3.3.1 reportedly allows Screenform formats to be stored as load modules for use with TSO applications, making Screenform totally transparent to the end user accessing these modules. Under TSO, Screenform formats that do not require a user response can also be designed for the display of messages or information.

Other features include new exit routines reported to provide better control over the usage of field names contained in Screenform, extended attributes and multiple device support. Screenform operates in the OS/MVS environment using 3270-type visual display terminals.

Pricing starts at $12,000, and product maintenance is provided free of charge for the first year. Information is available from the vendor at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

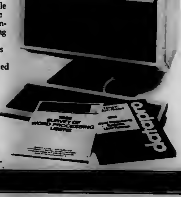
Local Data Announces Controller

TORRANCE, Calif. — A protocol controller said to allow asynchronous Ascii devices to be linked to IBM control units via coaxial cable has been announced by Local Data, Inc.

The Interlynx/3278 is said to perform the interface and protocol conversions necessary for plugging asynchronous personal computers, minicomputers, microcomputers, CRT terminals, word processors, port selectors, modems and hard-copy terminals into the IBM Type A coaxial port.

No hardware or software changes are necessary, the vendor claimed. An auxiliary RS-232C pass-through port can be dedicated to an asynchronous computer or modem, permitting the same asynchronous CRT terminal to be used with both IBM and non-IBM computers, according to the vendor.

The unit costs $1,750 from Suite 706, 2701 Toledo St., Torrance, Calif. 90503.



SCREEN OUT

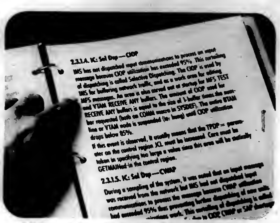
“IMF lets us solve them so quic

Keith Stone, Data Base Manager and Wally Morgan, Data Base Specialist —

“With Boole & Babbage's IMS MANAGEMENT FACILITIES (IMF),” we can concentrate on solving problems quickly, instead of guessing where they might be. When you're responsible for providing IMS service to 600 terminal users, like we are, that's really important.”

“About a month ago, we had a transaction which appeared to go into a loop and then abend. IMF/TRANSACTION TRACE showed only 8 data base calls, but one resulted in over 14,000 data base I/O's. We spotted this without inducing the overhead of DC MONITOR.”

“Before I had the IMF/WORKLOAD WAIT, I needed a trained person who knew how work flowed through IMS. But IMF shortens a long learning path — it makes our junior staff productive a lot sooner. As the technical manager, it even added to my own understanding of IMS by showing how work flows through the system.”



2.3.1.4. IC: Sel Dsp — CIOP

IMS has not dispatched input communications to process an input message because CIOP utilization has exceeded 95%. This curtailing of dispatching is called Selective Dispatching. The CIOP is used by IMS for buffering network traffic, and as a work area for editing MFS messages. An area is also carved out at startup for MFS TEST and VTAM RECEIVE ANY buffers. The amount of CIOP used for RECEIVE ANY buffers is equal to the size of 1-buffer times the number requested (both on COMM macro in SYSDEF). The entire BTAM line or VTAM node is suspended (ie: hung) until CIOP utilization drops below 85%.

If this event is observed, it usually means that the TPDP= parameter on the control region JCL must be increased. Care must be taken in specifying too large a value since this area will be statically GETMAINed in the control region.

2.3.1.5. IC: Sel Dsp — CWAP

During a sampling of the system, it was noted that an input message was received from the network but IMS had not dispatched input communications to process the message because CWAP utilization had exceeded 95% thus preventing further dispatching of new units [illegible] work. This curtailing of dispatching is called [illegible] due to CIOP, CWAP or SAP shortage

“If WORKLOAD WAIT says that transactions are waiting in Input Communications because of selective dispatching due to a CIOP shortage, you can go to the IMF documentation to find what that means and what needs to be changed.”

“IMF has made an incredible difference for us. Like day and night. It's an integrated approach — that's the beauty of it. It's got everything we need and it all works together: the complete realtime tool, historical data, and cost accounting. With IMF, we can manage our system's performance a lot more easily and effectively. We're elated with the IMF architecture.”

Discover the difference the IMF *total solution* can make for your system.

Write Boole & Babbage, 510 Oakmead Parkway, Sunnyvale, CA 94086. Or call 800-538-1893 (in Calif. 408-735-9550). In Europe contact the European Software Company, GmbH: Adersstrasse 30, 4000 Düsseldorf 1, West Germany.

MS PROBLEMS.

c kly, our users never see them.”

responsible for IMS data base/data communications service at a Southern U.S. data center

“With IMF I get off-line reports that correlate exactly to what I see in real-time. These were next to impossible to correlate before. We now have consistency and very readable reports—the data, formatting, and terminology are all the same!”

“Because we use MFS, when a user calls with a hung terminal after entering a service order, he doesn’t know the transaction code. Using the IMF/ISTAT SERVICE we can see the input message, the transaction code, and the LTERM that submitted it.”

“Sometimes we like to print out an IMF screen image so we can show management the effect of a change. It gives you a really good feeling to get some positive feedback from what you’ve done.”

“Having IMF monitor transaction queue time, elapsed time, and response time is absolutely essential. We set up 5 resource and 7 workload displays to be constantly refreshed every 5 seconds. Every minute this gives us a complete picture of how IMS is doing. It tells me at a glance that everything is okay.”

Boole & Babbage

NEW VISIONS IN SYSTEMS MANAGEMENT.

Fits Intel 8080-, 8086-Based Systems

Communications Controller Offered

MOUNTAIN VIEW, Calif. — The Microprocessor Division of Fairchild Camera and Instrument Corp. has introduced a multiple-protocol communications controller (MPCC) for interface with Intel Corp. 8080- and 8086-based computer systems to a serial data communications channel for computer-to-terminal or computer-to-computer communications and for control of network trunk lines.

The F16456 is said to provide control of both synchronous and asynchronous communications with one programmable chip.

The controller operates in several synchronous communications environments, processing data in both the bit-oriented protocol and byte control protocol modes.

The MPCC operates in full- or half-duplex and in normal or transparent text modes. It also generates and tests for error detection codes and special characters and maintains data transparency.

The controller costs $59.90 for quantities of 100 from Fairchild Microprocessor Division, 450 National Ave., Mountain View, Calif. 94042.

DEC-Compatible Multiplexer Out

MINNEAPOLIS — Saturn Systems, Inc. has announced a Digital Equipment Corp.-compatible eight-line multiplexer.

The SZV11 is a DEC Q-bus RS-232C asynchronous machine said to be compatible with DEC's DZ11 or DZV11. The unit supports 22-bit addressing and will run all standard DEC diagnostic and operating system software.

Some SZV11 features include quadruple packing density and extended data rate tables. The unit costs $1,150 from 6875 Washington Ave. S., Minneapolis, Minn. 55435.

Prentice Corp. Slashes Prices Of Two Modems

SUNNYVALE, Calif. — Prentice Corp. has cut $100 off the single-unit purchase price of two of its modems: the Model P'212 and the V.22.

Rack-mountable versions of the P 212, a single-card, microprocessor-controlled modem, which operates at zero to 300 and 1,200 bit/sec in an asynchronous mode and at 1,200 bit/sec in a synchronous mode, now cost $495. A stand-alone version of the P 212 now costs $595. The P 212 is compatible with the Bell 212/103 standard, the vendor said.

The V.22 rack-mountable unit, which can operate at zero to 300, 600 and 1,200 bit/sec in ao asynchronous mode and at 600 and 1,200 bit/sec in a synchronous mode, now costs $695. The stand-alone version of the V.22 costs $795. The V.22 meets CCITT requirements, the vendor said.

Prentice is located at 266 Caspian Drive, Sunnyvale, Calif. 94086.

CRG Announces File Transfer Aid

BATON ROUGE, La. — Communications Research Group, Inc. has announced the Block Asynchronous Transmission (Blast) file transfer software, said to employ an IBM Synchronous Data Link Control-like protocol.

Blast reportedly allows a range of minicomputers, microcomputers and superminicomputers to transfer files via standard dial-up telephones, satellite links, local-area networks and packet-switched networks. The software has been announced for Digital Equipment Corp.'s VAX-11; Apple Computer, Inc. products; IBM's Personal Computer; all Digital Research, Inc. CP/M- or MP/M-based products; and for the full range of Data General Corp. equipment, according to a vendor spokesman.

All Blast products are said to be compatible and can covert text files to the format of the receiving computer. The communications products reportedly employ a pipelined, full-duplex, sliding-window protocol that allows error-free transfer of data.

Prices range from $250 to $895, depending upon CPU size. More information is available from Communications Research Group, located at 8939 Jefferson Highway, Baton Rouge, La. 70809.

Dr Dixon R Doll
Pointing the way

Richard E Wiley
Right to the Point

W G McGowan
MCI's Point of View

Ivan Wolff
The Marketing Points

H Hershkowitz
Chase's Plan

Ben Scott
GTE's Plan

NOMAD2™ INFORMATION CENTER

NOMAD2 INFORMATION CENTER

No other micro can stand up to the Micro/PDP-11.

If you missed the beginning of the software age on April 19, 1983, don't miss this.

With our announcement of IDMS/R, a relational database management system, the Information Database, and a full range of personal computers software for the IBM P.C., it's clear that a software leader has emerged to offer data processing the solution for implementing a workable corporate computer strategy.

This may very well have some bearing on decisions you'll be making. So much so, that these announcements will be the subject of our next seminar.

The schedule for the seminar nearest you is below. Call the Corporate Meeting Department in Westwood, MA to reserve a place (617) 329-7700.

Atlanta, GA	June 30, 1983
Atlantic City, NJ	June 28, 1983
Baltimore, MD	May 26, 1983
Birmingham, AL	June 1, 1983
Buffalo, NY	June 15, 1983
Burlington, VT	June 29, 1983
Chicago, IL	June 7, 1983
Chicago-Arlington Hts., IL	July 12, 1983
Columbus, OH	May 26, 1983
Denver, CO	June 9, 1983
Fredericton, NB	Aug. 10, 1983
Grand Rapids, MI	June 9, 1983
Greensboro, NC	June 2, 1983
Greenville, SC	June 9, 1983
Houston, TX	June 23, 1983
Indianapolis, IN	June 2, 1983
Kansas City, MO	June 16, 1983
Lexington, KY	June 28, 1983
Los Angeles, CA	June 22, 1983
Louisville, KY	June 14, 1983
Meadowlands, NJ	June 8, 1983
Miami, FL	June 16, 1983
Milwaukee, WI	June 21, 1983
New Haven, CT	June 21, 1983
New Orleans, LA	June 23, 1983
New York, NY	June 22, 1983 July 26, 1983
Omaha, NE	June 22, 1983
Orlando, FL	June 7, 1983
Ottawa, ONT	June 23, 1983
Pittsburgh, PA	June 21, 1983
Providence, RI	June 28, 1983
Quebec City, QUE	June 7, 1983
Roanoke, VA	June 21, 1983
Rochester, NY	June 14, 1983
Rye, NY	June 9, 1983
St. Louis, MO	June 2, 1983
St. Paul, MN	June 1, 1983
San Diego, CA	June 21, 1983
San Jose, CA	June 7, 1983
Springfield, MA	June 7, 1983
Stamford, CT	June 1, 1983
Tampa, FL	July 7, 1983
Toronto, ONT	June 22, 1983
Vancouver, BC	June 7, 1983
Washington, DC	June 15, 1983
Wichita, KS	June 23, 1983

Cullinet

Honeywell Unveils Two Upgrade Kits For Level 6 Minis

WALTHAM, Mass. — Honeywell, Inc. has unwrapped two upgrade kits that provide three members of its Level 6 16-bit family of minicomputers with 32-bit processing power

The DPS 6/9X upgrade kits equip the Level 6 Models 47, 53 and 57 with the same processing power as the company's DPS 6/92 or 6/96 32-bit superminis.

Both kits include a separate central subsystem with cache memory/memory management unit, a 32-bit bus to the central processor, a commercial instruction processor capable of executing 80,000 Cobol-compatible instruction/sec and a scientific instruction processor capable of processing 1M Whetstone/sec

The kits also include the company's Megabus chassis equipped with 32-bit data paths; a system control facility for remote system monitoring and control; and virtual control panel features permitting full control panel functionality.

The DPS 6/92 contains a 20-slot Megabus chassis that is compatible with most Level 6 peripherals, 1M byte of memory, a multiple device controller with one printer port, a disk controller with two ports, a multiline communications processor with one RS-422 port and a system control facility that is built into the VIP7301 CRT terminal.

The DPS 6/96 is made up of a 40- slot Megabus chassis that also supports most Level 6 peripherals and controllers, 1M byte of memory, a multiple device controller with one printer port, a disk controller with two communications ports, a multiline communications processor with one RS-422 port and a system control facility that is built into the

(Continued on Page 94)

Xerox Corp.'a 16/8 Professional Microcomputer

Xerox 16/8 Micro Allows Simultaneous Operations

DALLAS — A combined 16-bit/8-bit professional computer that reportedly enables users to perform separate computer operations at the same time was announced here by Xerox Corp.

The Xerox 16/8 professional microcomputer is intended to be used as a standalone onit and as a workstation in an office communications network environment, the vendor explained. The system is comprised of a Zilog, Inc. Z80A 8-bit microprocessor with a 64K-byte memory and a 16-bit Intel Corp. 8086 microprocessor with an expandable base of 128K-byte memory.

The two microprocessors, each with its own memory, allow users to condoct two separate operations concurrently, eliminating the idle time common in most personal computer processing applications, Xerox maintained. For example, the user can simultaneously work on a financial spreadsheet application program while executing or printing a word processing program.

The system is also equipped with two operating systems — Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS — allowing users to choose from a wide range of off-the-shelf application software..Some of the packages available for the system from Xerox are word processing, financial modeling, business graphics and additional computer languages, the vendor noted.

Storage capacity of a 16/8 can range from 128K bytes to more than 10M bytes, according to the vendor, made possible by the variety of disk units available for the system. The user can reportedly choose from 8-in. or 5¼-in. disks, either aingle or double sided. In addition, there is a 10M-byte fixed disk available. When this is ordered, a double-sided 8-in. disk is also provided. Xerox said.

With the large storage capacity of the rigid disk, the 16/8 can handle operations usually associated with larger computers, Xerox contended, including accounts payable, payroll, inventory, manufacturing functions and data base management.

The recently announced Xerox Shared

(Continued on Page 86)

Computer Automation Unveils Multiuser Desktop Micro

BOULDER, Colo. — Computer Automation, Inc. has unveiled a multiuser desktop microcomputer for business applications that is based on the Intel Corp. 80186 microprocessor.

The Omnix 186 incorporates a design architecture that dedicates one 16-bit 80186 microprocessor to handle multiple applications programs, while a second proprietary 16-bit microprocessor manages data traffic from disk drives and user terminals.

A third Intel 8087 microprocessor can be added to the system for high-speed mathematical operations, the vendor said.

The Omnix 186 can support up to 16 terminals and printers engaged in processing different, but concurrent programs for small business applications. The vendor claimed the Omnix 186 can operate at about twice the speed of microcomputers designed around the Intel 8086 microprocessor and at about four times the performance of the company'a earlier Omnix systems.

The Omnix can use standard software, such as programs developed to run under Digital Research, Inc.'s CP/M and CP/M-86 operating systems and Computer Automation's Opus-1 operating system. It can also use other proprietary software for multiuser business programming, according to a spokesman for the vendor.

The Omnix 186 costs from $8,990 for a system with a 5M-byte Winchester disk drive and a 1M-byte floppy disk drive. A larger system with one 20M-byte Winchester disk drive costs $12,490. The systems will be available in July with volume shipments slated to begin in October.

More information is available from Computer Automation, which is headquartered at 4890 Sterling Drive, Boulder, Colo. 80301.

TI Cuts Business System Prices

AUSTIN, Texas — Texas Instruments, Inc. has announced 6% to 30% price reductions on selected models of its Business System 300 and 600 series processors. In addition, the firm cut prices on its add-on Winchester disk subsystems for the business systems series.

As examples of the price cuts, the vendor said, the Business System 350 has been reduced from $12,495 to $9,995. In addition, prices for all systems equipped with a Winchester disk subsystem have been reduced by $1,000. All of the firm's 18M-byte Winchester systems have also been reduced by $2,000.

Models affected by the price cuts include the Business System 350 and 351 (5M- and 10M-byte versions), the Business System 371 (18M-byte versions), the Business System 651 (10M-byte versions) and the Business System 671 (18M-byte versions), according to a spokesman for the vendor.

In addition, price cuts for corresponding Winchester disk add-on products range from $1,000 to $2,000. The price reductions are available immediately, the vendor said.

More information is available from the vendor'a Data Systems Group, which can be reached through P.O. Box 402430, H655, Dallas, Texas 75240.

Altos Computer Extends 586 Line

Altos Computer Systems' 586 Microcomputer

SAN JOSE, Calif. — Altos Computer Systems, Inc. extended its 586 family of multiuser microcomputers with a system that provides up to 40M bytes of hard disk storage and can be expanded to hold up to 80M bytes.

The 586-14, like the other 586 family members, contains the 10 MHz version of the 8086 microprocessor and runs the Xenix operating system. The system is compatible with Ethernet, Systems Network Architecture, 3270, 3780 and X.25 protocols in addition to its own local-area network, Altos-Net.

The unit contains up to 512K bytes of main memory and features an intelligent hard disk and tape controller, memory management, six serial 1/O ports, battery-packed clock and calendar, Multibus-type architecture and power failure detection.

The 586-14 also runs programs developed under the MS-DOS, Pick, MP/M-86 and Oasis-16 operating systems. Programming languages available for the 16-bit system include Basic, Cobol, Fortran, Pascal and C.

The 40M-byte version of the system is priced at $10,990, the vendor said from 2641 Orchard Pkwy., San Jose, Calif. 95134.

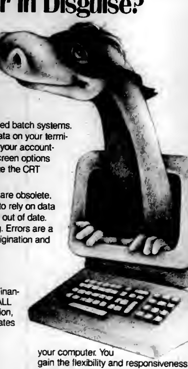
Xerox 16/8 Performs Multitasking

(Continued from Page 1)

Interface Unit (SIU) will connect the 16/8 directly to Ethernet, the vendor said. Users can either connect the machine directly to the SIU unit or modem or connect the SIU over telephone lines. If connected with a modem, someone working at home, for example, can communicate with a 16/8 professional computer on the Ethernet network at the user's office, Xerox said.

Two daisywheel printers manufactured by Diablo Systems, Inc., a Xerox subsidiary, are available for the 16/8, the vendor continued. One operates at 40 char./sec, while a lower cost unit runs at 20 char./sec. Both print bidirectionally in either 10 or 12 pitch. Xerox software for a matrix printer and plotter is reportedly available. Also, serial and parallel printers from a number of manufacturers can be interfaced with the 16/8, the vendor added.

The Xerox 16/8 professional computer will make its debut at the National Computer Conference. First deliveries are slated for August. Purchase prices range from $3,395 to $5,295, the vendor said from 1341 W. Mockingbird Lane, Dallas, Texas 75247.



Yes
We have it!
Wangwriter
OWN
OWN
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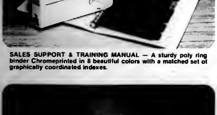

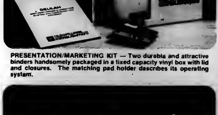

REDUCE APPLICATION BACKLOG.
ENHANCE PRODUCTIVITY.
STRETCH YOUR DP RESOURCES.

Read Computerworld's Special Report on Software Productivity Packages on June 27th.

Reduce application backlog. Enhance productivity. Stretch your DP resources. Read Computerworld's Special Report on Software Productivity Packages on June 27th.

You'll get a complete report designed to fill you in on systems software packages: Systems, teleprocessing monitors, capacity management/performance measurement tools. And, on utility packages: Debugging aids, application generators, sorts, query languages and report writers.

In addition, you'll get coverage of software products other than applications software packages that are *used by programmers rather than by end users.* These will include decision support systems, fourth generation languages and application development systems.

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"When do you know when you need a programmer productivity package?"

"Trends in mainframe operating systems."

"What role does DP play in a company's use of a decision support system?"

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For these and many more stories designed to ask — and then answer — all your questions, just turn to your June 27th copy of *Computerworld's* Special Report on Software Productivity Packages.

And if you *sell* software productivity packages to professional DPers or to end users, you won't find a better place to reach your customers. They'll be reading this Special Report. Ad deadline is June 10th, and your *Computerworld* salesperson can give you all the details. Or, to be sure and get your ad included, just call Don Fagan, Vice President, Sales at (617) 879-0700.

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Announces Graphics Controller

Raster Upgrades Graphics Line

NORTH BILLERICA, Mass. — Raster Technologies, Inc. has announced a color graphics controller and added two-dimensional display list capabilities for its Model One graphics systems.

The Model One/25 controller supports image memory configurations of 512 by 512 pixels with up to 24-bit planes, offering up to 16 million colors, a spokesman said. The product uses a 16-bit microprocessor providing up to 128K bytes of random-access memory and 64K bytes of programmable read-only memory. The Model One/25 supports the company's Display List Firmware and multiple alphanumeric window capability. It is software-compatible with other members of the Model One family, a spokesman said.

Prices begin at $10,500.

The Raster Display List Firmware works with standard Model One graphics entities to perform local processing of a stored graphics data base. All scaling, rotation and translation can be handled locally, off-loading host processing.

The firmware allows local storage of 15,000 Model One graphics primitives, including vectors, polygons, circles, arcs, rectangles and compactly encoded text. The firmware supports filled and unfilled primitives in the same manner as the Model One. Compact encoding and the ability to manage primitives is said to improve local segment storage capacity.

The price is $1,000 when ordered with a Model One/25, Model One/40 or Model One/60. Raster is located at 9 Executive Park Drive, North Billerica, Mass. 01862.

Aid Converts Ascii Disks To Ebcdic

NEW YORK — CP National has added a facillty to its microcomputer-based telephone accounting system designed to convert standard formatted 8-in. Ascii disks from this system to the standard Ebcdic code compatible with an IBM mainframe computer.

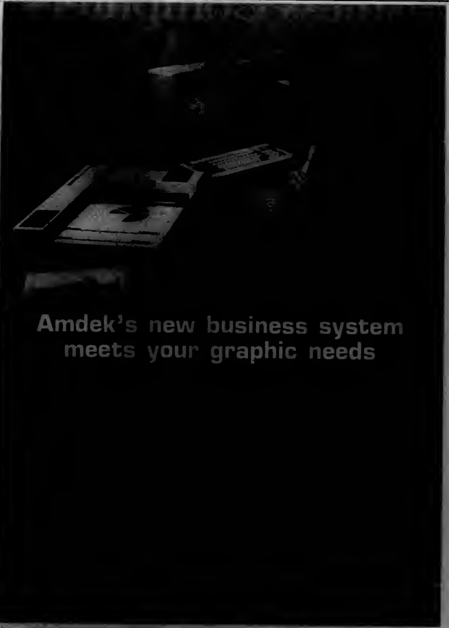
The converter enhancement reportedly enables users to store, manage and report on call data using their installation's mainframe computer. The enhanced stand-alone systems enable the telephone call accounting system to use vertical and horizontal coordinates to assign the costs to calls rather than averaging them out by area code.

This capabillty allows for the identification of calls by destination, city and state, in addition to the called number, a spokesman for the company said.

The enhanced stand-alone system offers local storage of 10,000 to 100,000 calls, depending on hard disk capacity, and accommodates from 40 to 200 lines. Its price starts at $19,000.

As either an option to new enhanced stand-alone systems or as a retrofit for existing units, the converter enhancement is available for $3,500.

More information on the enhancement is available from CP National, which is located at 1180 Avenue of the Americas, New York, N.Y. 10036.



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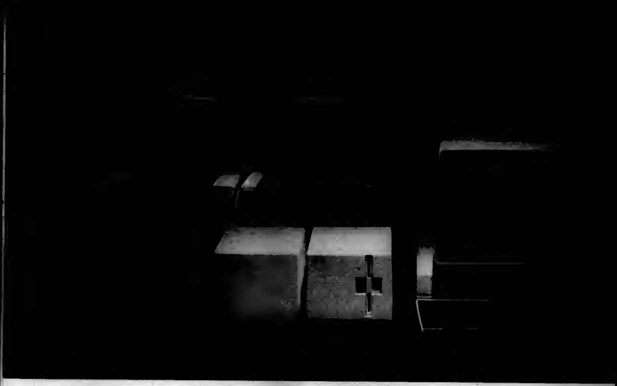


Visual 1050 Micro Announced

TEWKSBURY, Mass. — Visual Technology, Inc. has announced the Visual 1050 microcomputer, which comes with a library of bundled software packages.

The processor includes two 400K-byte disk drives, 96K bytes of random-access memory (expandable to 160K bytes), a high-resolution 640 by 300 pixel bit-mapped monochrome display, a printer port, modem port, Winchester disk expansion port and a detached 93-key keyboard.

A variety of software packages are included in the purchase price. They include the Multiplan spreadsheet package by Microsoft Corp; Wordstar Release 3.3 from Micropro International Corp.; GSS-Graph, a graphics package from Graphics Software 5ystems, Inc.; and Digital Research, Inc.'s G5X-80 graphics device driver and CBasic programming language, the vendor said.

Visual 1050 špplications packages are specially adapted to share data and perform as an integrated software family. Users can, for example, prepare a budget using Multiplan, pass it to Wordstar for presentation in document form or translate it into charts and graphs by using GSS-Graph.

Visual 1050 costs $2,695 from 540 Main St., Tewksbury, Mass. 01876.

Honeywell Unveils Facility for PPS 11

WALTHAM, Mass. — Honeywell, Inc. has announced the availability of a modular Electronic Forms and Fonts (ELF) facility for its nonimpact, high-speed Page Processing 5ystem (PPS 11).

The newly developed facility reportedly enables users to design custom forms and fonts interactively and to print multiple jobs with varying forms in a nonstop mode.

The ELF system is said to print at a resolution of 200 dot/in., providing quality for shadings, text, rules and most graphics. PPS metal format cylinders, which print at 500 dot/ln., may be used in conjunction with the ELF facility in cases where near-graphic-arts-quality images are needed, the vendor pointed out.

Forms sizes may be up to 11-in. wide and from 3½- to 14-in. long. Preprinted forms may also be used, the vendor said.

In addition to controlling the design of forms and fonts, the ELF facility modules control the automated methods available to load those designs into the PPS nonimpact printer, Honeywell said. The vendor reportedly provides roughly 30 fonts with the facility.

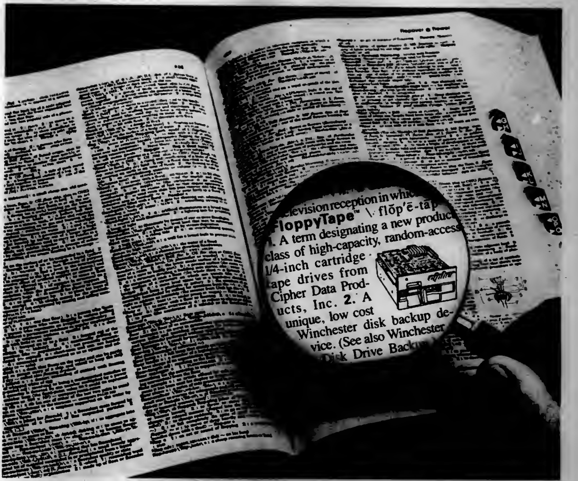
Priced at $22,500 plus maintenance, the ELF facility can be obtained from Honeywell at 200 5mith 5t., Waltham, Mass. 02154.

Level 6 Line Upgraded

(Continued from Page 85)

VIP7301 terminal, a spokesman for the vendor said.

Level 6 users purchasing either upgrade kit must give back to Honeywell the processor, memory, controllers and device boards. The company said this is necessary in order to "assure proper operation of the upgraded system with the existing peripherals." The DPS 6/92 kit carries a price tag of $75,000, while the 6/96 kit costs $95,000 plus a one-time installation charge of $3,000. Both kits are currently available, the vendor said from 200 5mith 5t., Waltham, Mass. 02154.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Albert Micro Introduced, Compatible With Apple IIe

THOUSAND OAKS, Calif. — Albert Computers, Inc. has introduced a computer said to be compatible with Apple Computer, Inc.'s Apple IIe.

The Albert microcomputer is said to include about 15,000 programs and reportedly provides color graphics with a 256-color palette.

Other features include a 40-col. format, expandable to 80 col.; a detachable keyboard; built-in communications for RS-232, RS-422 and RS-423; and serial and parallel printer ports, according to a spokesman for the company.

The system is also said to include a built-in speaker with amplifier and microphone input jack for record and playback of digitized voice or music, time-of-day clock to program timed reminders and five internal I/O expansion slots.

The computer sells for $1,595 from the vendor at 3170 Los Feliz Drive, Unit C, Thousand Oaks, Calif. 91362.

Subsystem Out, Provides Backup For IBM Series/1

ANAHEIM, Calif. — Datum, Inc. has announced an extra-capacity ¼-in. cartridge tape streaming subsystem designed to provide storage backup for IBM's Series/1 minicomputer.

Called the DSC 50X, the subsystem has a total formatted capacity of 45M bytes (48.6M bytes unformatted) on nine tracks. Recording density is 8,000 bit/in., and up to 45M bytes of formatted data can be transferred from disk to tape in nine minutes. The unit has a sustainable transfer rate of 5M byte/min, the vendor said.

The DSC 50X is compatible to the firm's older DSC 50, a 20M-byte cartridge streamer subsystem. Users of the DSC 50 can upgrade their current systems to the 45M-byte DSC 50X without making software changes. The data stored on the DSC 50 is fully compatible with the DSC 50X, the vendor said.

The DSC 50X consists of a single-board Datum tape controller, a ¼-in. cartridge tape streaming transport manufactured by Archive Corp.; an integral power supply, software and necessary cables. The unit costs about $5,000, the vendor said from 1363 S. State College Blvd., Anaheim, Calif. 92806.

Systech Unwraps Print Controller

SAN DIEGO — Systech Corp. has announced the MLP-2000, a dual printer controller for systems compatible with Intel Corp.'s Multibus.

The MLP-2000 was designed to adapt automatically to Dataproducts Corp. or Centronics Data Computer Corp. interfaces. The unit will support a combination of printers simultaneously. For example, one port could be servicing a letter-quality communications printer while the other port is servicing a 2,000 line/min line printer, according to a spokesman for the company.

In addition, the MLP-2000 is equipped with a self-test feature that allows users to test either printer by flipping a toggle switch. The self-test feature sends a 96-char. Ascii pattern to the selected printer for 80 col. to check the operation of the printer, cable and controller without CPU intervention, the vendor spokesman said.

The MLP-2000 costs $650, the vendor said from 7630 Miramar Road, San Diego, Calif. 92126.

With Local Interconnect and More

Wang Beefs Up Professional Computer

By Bruce Hoard
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has boosted its Professional Personal Computer with a local interconnect option, several communications options, a Professional Computer voice attachment, a runtime support system, enhanced word processing, systems software and third-party software.

The Local Interconnect Option allows the clustering of Wang Professional Computers and provides users with high-speed baseband local-area communications with other Wang Professional Computer users.

The hardware and software package allows users to access devices on other Wang Professional Computers, share resources, such as program and data files, and transmit messages. Available in December, a typical eight-user configuration can be connected at an approximate cost of $500 per workstation.

A new feature for the already introduced Local Communications Option — which differs from the Local Interconnect Option — is the OIS and IIS/VS archiving utility, a software package that enables users to store OIS and IIS/VS word processing documents from an OIS or VS system on the Wang Professional Computer in a format appropriate for later editing, retrieval, copying and/or conversion.

The Local Communications Option with the archiving utility will be available in December for $2,000. An upgrade for current Local Communications Option users costs $50.

The Local Communications Option can also provide a file sharer software package that enables users to take file programs operating under Microsoft, Inc.'s MS-DOS and transfer them to larger disk capacity of an OIS or IIS/VS. The file sharer software, available in December, costs $500.

In the communications area, Wang unveiled IBM 3276 Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) and 3270 Binary Synchronous Communications (BSC) devices for its Professional Computer. Available in July, the 3276 and 3275 BSC packages and the 3276 SNA/SDLC packages cost $400 each. A multiport communications controller required for both packages costs $500.

The Professional Computer Voice Attachment establishes one-keystroke telephone connections for voice and data calls and allows multiparty telephone communications. It also provides automatic answering capabilities for incoming calls, as well as the amplification of telephone communications for conference calls. Available in September, the voice attachment costs $500. The programmer utilities package costs $200.

PC Notebook is an end-user-oriented application for the storage and retrieval of unstructured text that can be integrated with the Professional Computer Voice Attachment so users can create an automated Rolodex-like application. Available in August, it costs $200.

The UCSD P-System runtime support enhancement allows industry standard applications running in that mode to be utilized on Wang systems. Available in September, it costs $100.

The latest release of PC-Word Processing reportedly offers complete compatibility with all other Wang products. Documents created on the Professional Computer can be transferred directly to Wang OIS, Wangwriter, 2200 and VS systems.

The package includes the ability to merge, page, sort, prepare a new disk and copy and delete documents. Available in July, PC-Word Processing costs $500. Users of the first release can upgrade for $50.

The Professional Computer system software has been enhanced to support such features as disk copying, file comparing, Winchester disk formatting, text editing and text file translating. Available in June, it costs $50.

The firm is located at One Industrial Ave., Lowell, Mass. 01851.

Electronic Mail Ties U.S.-Canada Service

NEW YORK — An electronic mail service combining telecommunications with national mail services between the U.S. and Canada is available from the U.S. firm Electronic Mail Corp. of America (Emca) and the Canadian cooperative of companies, Transcanada Telephone System (TCTS).

Messages can be input through virtually all host computers, DP and word processing systems, telex/TWX terminals, facsimile, magnetic tape, telephone and typewritten material by hand delivery, Emca said.

Access modes include 50-, 110-, and 1,200 bit/sec asynchronous and 9,600 bit/sec synchronous communications. Direct Distance Dial, GTE Telenet Communications Corp. or Uninet, Inc. packet-switched networks are also included, as are Western Union Telegraph, RCA, ITT and MCI Communications Corp. communications lines.

When the information is received, it is sent between both companies' CPUs via the Telenet and Datapack packet-switched networks in the U.S. and Canada, respectively.

Emca then distributes the messages through the U.S. Postal Service's Electronic Computer-Originated Mail service.

TCTS uses Canada Post Corp. and its Envoy 100 electronic mail service for delivery in its country. The companies claimed that next-day delivery could be expected in most U.S. and Canadian cities.

A typical 10-line message to Canada is priced at $2. Subscriber costs are $20, plus $3/mo/user/usage. More information is available from Emca, Suite 4300, 30 Rockefeller Plaza, New York, N.Y. 10112.

For CLI VTS 1.5

Still-Frame Option Out

SAN JOSE, Calif. — Compression Labs, Inc. (CLI) has announced a still-frame color option that reportedly enables users of its video teleconferencing system, VTS 1.5, to send and receive still images over data transmission lines.

The option lets users select either full-motion video teleconferencing at 1.5M bit/sec or still-frame conferencing at 56K bit/sec. To switch from one mode to another reportedly requires no power-down or mechanical switching. The still-frame capability allows transmission of images of people, graphs, slides, charts and maps at a rate of 7 sec/frame.

Still frame allows users to install their VTS 1.5 equipment without waiting for a 1.5M bit/sec line to become available.

The single-quantity price of the still-frame option is $6,500 with the purchase of the VTS 1.5 full-motion system and TV-graphics option. Availability will be in the third quarter from 2305 Bering Drive, San Jose, Calif. 95131.

Wang VS Line Gets Network, Remote Tool

LOWELL, Mass. — Wang Laboratories, Inc. has unveiled a network and remote office support system for its VS product family.

VS Express was designed for VS networks that support multiple remote offices. It combines such tools as memos, phone messages, distribution lists, "To Do" lists and calendars in a ready-to-use form that operates across VS office networks, Wang claimed.

The menu-driven package may also be utilized on single systems. On-line instruction screens provide users with complete explanations of each application and outlines for network and system maintenance.

VS Express is available for a license fee of $15,000 for the VS 25, 45 and 80 and $18,000 for the VS 90 and 100. Wang is located at One Industrial Ave., Lowell, Mass. 01851.

Kelley WP/DP Interface Aid Targets Wang VS/IIS Users

MISHAWAKA, Ind. — Kelley World Co. has introduced a word processing/data processing interface utility for Wang Laboratories, Inc.'s VS/IIS systems.

Keypro is said to allow the retrieval of information from up to four data files simultaneously and the insertion of the retrieved data into a word processing document.

In addition to merge list applications, the program provides random retrieval of information. Simple logic statements permit insertion of optional paragraphs.

Keypro costs between $750 and $1,500 from Kelly World, 61501 Bremen Highway, Mishawaka, Indiana 46544.

CPU Translates Language of Text

AUSTIN, Texas — Challenge Systems, Inc. has announced a processor that translates text from one language to another.

The Translating Word Processor (TWP) provides full text translation at from 4,000 to 5,000 word/hour, with 90% accuracy, the firm said.

TWP costs about $25,000 from the firm at Suite 164, 1016 La Posada, Austin, Texas 78752.

3290 Information Panel

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The goal of any information system is to show you new relationships between different kinds of data. And better, faster ways to get things done.

IBM's new display systems and work station products make this easier and more efficient.

The first is the extraordinary IBM 3290 Information Panel shown above. Its state-of-the-art flat gas panel can display up to 9,920 characters of data and a wide range of graphics, such as line drawings, charts and sketches.

Even more important, the distortion-free screen can simultaneously display four applications from one or more computers.

It means, for example, you can see a customer's file, your inventory levels, production status and the text of a letter acknowledging an order—all at the same time.

Next is a new version of IBM's highly successful Personal Computer: the IBM Personal Computer XT. It can be linked with large host computers, and it comes with its own fixed disk drive that can store more than 10 million characters or up to 5,000 pages of text or 100,000 names and addresses.

Then there's the IBM 3270 Personal Computer Attachment which does exactly what its name implies. It converts any 3278 display tied to a central computer into a personal computer, simply by pressing two keys.

There's also the new IBM 3178 Display Station, an attractive, low-profile terminal that provides the most popular functions of the widely used 3278 Model 2 display at a significantly lower price. The 12-inch screen can display up to 1,920 characters and swivel or tilt for easy use.

Four new models of the IBM 3274 Control Unit offer dramatic price/performance improvements in directing communications between a host computer and display terminals and printers. Features include a faster, more powerful microprocessor and 50 percent more control storage than previous models—all at the same or lower cost.

Last, but not least, is the new IBM 3299 Terminal Multiplexer. It connects as many as eight terminals or printers to the 3274 Control Unit with a single cable—instead of eight individual cables—significantly reducing installation costs. When these last three products are combined in a system, the average price per work station is significantly reduced.

Our newest work station products also come with a host of financial incentives. New volume discounts, attractive financing packages and improved availability make them easier than ever to acquire.

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OTA Agrees Trade Barriers To USSR Hurt U.S.

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Congressional Office of Technology Assessment (OTA) has joined the critics of U.S. export control actions in claiming that restricting trade with the Eastern bloc for foreign policy purposes hurts the U.S. more than it does the Soviets.

Recently, the U.S. has restricted trade in agricultural products and energy technology as an expression of displeasure with Soviet adventurist actions around the world, particularly following Russia's military intervention in Afghanistan in late 1979. These restrictions have been eased, but high-tech trade, especially in computers, between the U.S. and the Soviets remains almost nonexistent.

Of these actions, OTA said in a report issued last week, "U.S. sanctions and embargoes may well have hurt the USSR, but it is unlikely that they have hurt enough to make a real economic difference."

(Continued on Page 106)

Processing, Service Firms Seen Diversifying Products

By Bill Laberis
CW Staff

NASHVILLE, Tenn. — Computer processing and service firms have shown a marked trend toward diversifying product offerings and branching out from the niches in which they grew up, the preliminary results of an industrywide study have found.

The study also shows that processing firms are gearing up for the micro software revolution and exploring new means of software delivery for what they feel will be the key to revenue growth over the next several years.

The preliminary results, prepared by Input of Mountain View, Calif., were presented to a packed house at the 58th Management Conference of the Association for Data Processing Service Organizations, Inc. (Adapso) here earlier this month. The results came from two ongoing studies, one of which is prepared annually for Adapso, which compares the performance of its membership with the rest of the computer industry.

CW Photo by B. Laberis
Peter Cunningham

The Adapso study, to be released in its entirety in June, showed that revenues for processing service firms and professional service firms grew approximately 16% and 14%, respectively, in 1982. Processing firms were defined as those providing computer processing services primarily, while professional service firms largely provide DP consulting services.

But in both types of companies, most revenue growth came from areas of business other than traditional processing or professional services, indicating a movement into other business areas, according to Peter Cunningham, Input president, who presented the study results. The preliminary results, he explained, were derived from the 100 largest of the 400 companies to be polled.

(Continued on Page 104)

American Bell's Marshall Greets Adapso as Partner in Marketplace

By Bill Laberis
CW Staff

NASHVILLE, Tenn. — "We want to meet you as partners working in common ... and as partners in competition in the marketplace. We don't want to meet you in the courthouse ... No more with the black-robed guys in front of the bench. That's expensive."

CW Photo by B. Laberis
Charles Marshall

With words like those, Charles Marshall, president and chief executive officer of American Bell, Inc., unveiled the course he said he will chart at the helm of AT&T's unregulated competitor in the computer equipment and services industry. He reg-

(Continued on Page 104)

IBM Strategy Seen Confusing

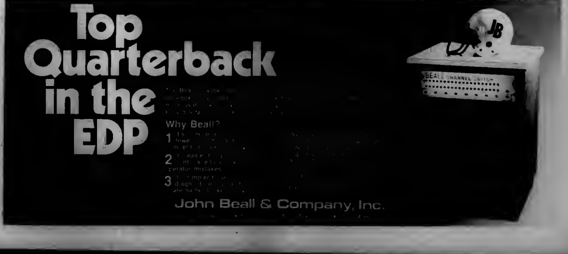
By Tom Henkel
CW Staff

MEDFORD, N.Y. — While IBM's more aggressive, more flexible marketing strategy is offering users better deals, it is also making users' lives very confusing.

According to a recent report issued by American Management Services (AMS), an independent consulting and publishing firm here, IBM now has so many marketing agreements, each with its own variations, that it is difficult for users to keep track of them. in addition, there are many options available through IBM's third-parties' affiliates, making the equipment selection process even more difficult, AMS said.

For example, AMS pointed out, there are quantity discounts on many IBM prod-

(Continued on Page 100)



Burroughs Contracts With Vendors

DETROIT — Burroughs Corp. has contracted with five third-party software houses to provide applications software for its recently announced small business computer, the B 20.

Included in the list of vendors signed are: Microsym, Inc. of Wayne, Pa., designer of packages for project management systems; Entech, Inc. of Ann Arbor, Mich., which provides commercial energy audits software; Spectrum of Salem, Mass.; Case Systems Associates, Inc. of Crescent Springs, Ky.; and Automated Programming Technologies, Inc. of Birmingham, Mich., maker of software tools.

The B 20's operating system will support four industry-standard languages including Basic, Cobol, Pascal and Fortran.

IBM Marketing Strategy Seen Confusing to Users

(Continued from Page 99)

ucts, such as System/34; System/38, 3350 disk drives, 3278 terminals and 5291 and 5251 displays. In addition, IBM offers special discounts through its value-added remarketer agreements and long-term leases through IBM Credit Corp. IBM also appears more willing to accept special bids on systems.

"By the very nature of special bids, it is not possible to know if the rules for such bids are applied in the same manner to all customers," the AMS report claimed, adding that IBM has not made it clear which users are entitled to special considerations or when.

Making the product selection process even more confusing for users is IBM's change in the way it announces products, the report said. Formerly, IBM would invite users to elaborate kickoff meetings held every three to five years to announce new products. Users had plenty of time then to make a purchase decision, the report said.

Now IBM has adopted a policy of rapid-fire product announcements, accompanied by many price changes. "Many of the changes have helped users," the report said, "but at the same time, it has become much more difficult for a user to stay informed on all the changes. Staying informed about IBM policies, products and prices has become a full-time endeavor. There is no reason that this situation is going to change anytime soon."

AMS contended that IBM's step into the leasing business with IBM Credit will have "far-reaching Implications for the third-party IBM marketplace," with IBM being a strong competitor of leasing companies.

But so far, AMS said, IBM Credit has suffered from a lack of flexibility with regard to terms and equipment and, therefore, other leasing companies have not yet lost any business.

But if IBM's new leasing strategy is successful, it will reduce the amount of equipment under IBM's traditional rental and lease programs and will free up additional resources.

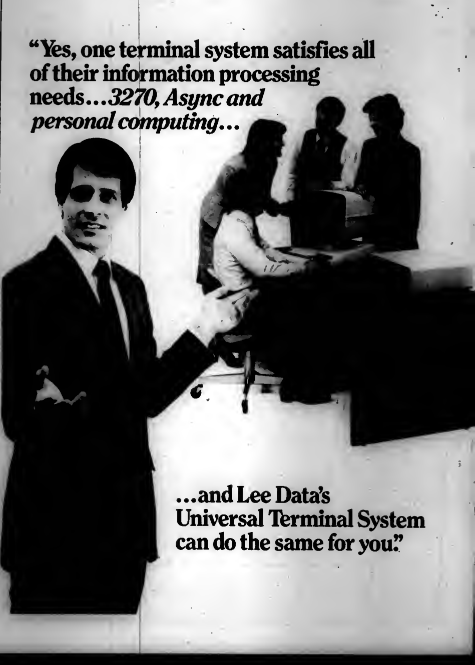
The AMS report, titled "Inside IBM," costs $120 and is available through American Management Services, P.O. Box 350, Medford, N.Y. 11763.

Boeing Computer Forms Group to Unite DP, OA

SEATTLE, Wash. — Boeing Computer Services Co. has announced the formation of an organization designed to unite its data processing, network services and office automation functions.

The Information Network Services Group will begin offering network services commercially, reportedly allowing users to get on-line quickly with minimal capital investment and risk. It will also provide a network architecture compatible with IBM's Systems Network Architecture supporting the X.25 communications standard.

The new group will be headed by Alvin M. Savio, who was formerly director of strategic planning for the company.



Graphics Mart Forecast at $7.9 Billion by 1986

FRAMINGHAM, Mass. — Graphics will become a $7.9 billion market by 1986, having grown at an average compound rate of 26.3% per year since 1981, according to a recently released study from International Data Corp. titled "Industry Trends in Computer Graphics."

"With the onset of the 1980s, the graphics industry began a transition from a technology-based, sophisticated user orientation to an orientation based on standard products for a broad spectrum of users," the report said. As these changes have occurred, large computer system manufacturers have entered the market, graphics companies have merged and new ventures in the graphics business have begun.

The report claimed the industry structure will likely change in that the number of firms with greater than $100 million in computer graphics revenues will increase from six in 1981 to more than 20 in 1984. Present suppliers will reportedly have to modify business strategies and marketing plans to adjust for changes in competitive environments.

Although poor economic conditions have hindered the growth in graphics since 1982, the demand will increase in the next three years. Among the markets that will benefit from this demand are the graphics workstation, graphics display and hard-copy output markets, the study continued.

Two types of graphics workstations are predicted to develop — dedicated workstations and terminals such as the IBM 3279 graphics terminal. The demand for workstations in business graphics is predicted to increase from 12,000 units in 1983 to 20,000 in 1986. The demand for terminals will rise from 18,000 in 1983 to 95,000 in 1986, the report predicted.

The more complex graphics display market will rise from a $477 million revenue market for U.S. manufacturers in 1983 to one totaling $757.7 million in 1986, the report said.

Perhaps the most dynamic area of the graphics market is the plotter and printer/plotter products. "U.S. functional demand will undergo a tenfold increase from 1981 to 1986," the study said. The majority of the unit growth will occur in tabletop units, which will increase for business graphics use from 7,800 in 1983 to 14,500 in 1986.

Freestanding units designed to produce large outputs will also increase in unit consumption in business graphics from 850 in 1983 to 1,200 in 1986. In addition, "the introduction of freestanding units priced under $25,000 is expected to stimulate demand in [computer-aided design and manufacturing] and scientific/engineering applications."

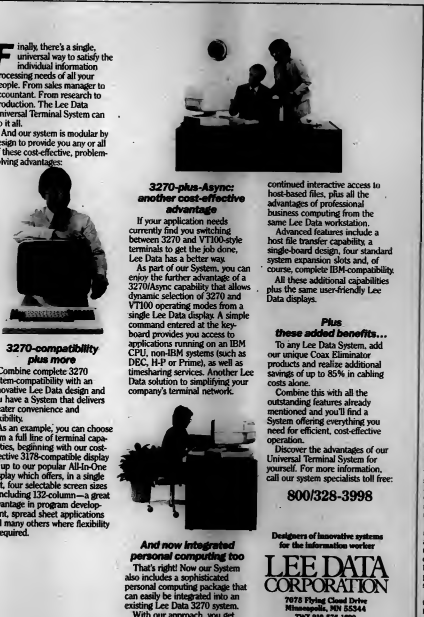
Program To Cover Protection

ARLINGTON, Va. — The Association for Data Processing Service Organizations, Inc. (Adapso) has established a software protection central clearinghouse program to collect and disseminate information to software vendors, particularly those vendors with micro software offerings.

According to Rick Magnuson, a member of Adapso's Microcomputer Software Association board of directors, Adapso will be collecting information on hardware devices to protect software and software solutions that are low-cost, transparent to the end user, easy to use and install and readily available on the market.

Adapso will collect submissions through July 1, and association members will test the products and submit comments to the developers. Participants will receive a report on the results this fall, a spokesman said.

Further information on the effort can be obtained from Adapso, which is located at Suite 300, 1300 N. 17 St., Arlington, Va. 22209.



AT 11 A.M. ON MARCH 2ND, THE WORLD CHANGED.

(10:59 A.M.)

(11:00 A.M.)

Baby Bell's Marshall Greets Adapso as Partner

(Continued from Page 99)

istered his remarks at the 58th Management Conference of the Association of Data Processing Service Organizations, Inc. (Adapso) here recently.

Sounding sermonic at times, amusing or philosophical at other times during his luncheon address, Marshall indicated that American Bell wants to end the adversary relationship that at times flared up between AT&T and some Adapso member companies.

'Very Painful' Transition

Marshall also described what he termed the "very painful" transition from a regulated, giant monopoly trying to break into competitive markets to an unregulated "company with a payroll of 28,400 and not a single dollar of revenue."

AT&T, Marshall said, faced some unsavory choices offered by government regulators when the company sought to compete in unregulated markets, choices "that would have cut us to pieces."

CW at Adapso

The "choice" AT&T accepted last year, developed by the U.S. Justice Department, "allowed us to pursue technology into the marketplace . . . and maintain our vertical integration, so important in an industry like ours," he said. As is well known, AT&T will by next Jan. 1 shed its Bell operating companies while maintaining its long-distance service, its research and development and manufacturing facilities at Western Electric and Bell Laboratories and its new unregulated entity, American Bell.

Evaluating the government-sanctioned reorganization of AT&T, Marshall said, "It recognizes the incompatibility of monopoly competition while diffusing the issue of the alleged size and power of AT&T. It also removes the basis for long-distance competitors' complaints about equal access, because we in fact are a long-distance competitor now."

Turning to American Bell's relationship with the Adapso member companies, Marshall said American Bell will provide software and service companies with enhanced capabilities to deliver electronically software via American Bell's Advanced Information Systems/Net 1000 intelligent packet-switching network.

DP Service Firms Diversifying Products: Study

(Continued from Page 99)

Revenues from software companies reporting were up 28% in 1982, down considerably from the 42% revenue gain in 1981. Cunningham attributed this slower growth to recessionary effects, predicting that software revenues industrywide will grow in 38% chunks through 1987, rising from $5.5 billion in 1982 to $27.5 billion in 1987.

"The primary reason for this growth is the huge base of obsolete software out there now," Cunningham said. In addition, life cycles for both hardware and software are shortening, all of which will create "fabulous opportunities" for companies like the Adapso members.

Vendors of integrated systems will see their revenues grow an average of 29% per year through 1987, the Input results showed. Ed Metz, company vice-president, said this figure actually understates the overall growth in integrated systems, as it does not include the value of imbedded government systems, primarily purchased by the Department of Defense. The greatest growth in this area will accrue to those firms whose systems are built around "smaller hardware" as opposed to mainframes and superminis, Cunningham said.

But Cunningham issued a warning to vendors and systems integrators of personal computers, claiming that this market is rapidly becoming flooded with redundant products. Future personal computer offerings, he said, should be able to be integrated into other current product offerings. "A lot of people are going to lose their shirts in the personal computer area," he said.

These revenue growth predictions for software and integrated systems compare favorably with overall growth in the entire information processing industry, which Input has pegged at 24% per year through 1987. Computer industry figures compare very favorably with the anticipated growth in other key industries in the U.S., such as steel, rubber and autos. Growth in these areas is expected in the 1% to 8% range, Cunningham said.

In general, industry results both from the Adapso survey and the industrywide survey showed the effects of the recession, Cunningham continued. The results indicated an "industry upheaval" in which were exposed the product weaknesses in the flagship companies. These companies reacted soon by lopping the fat from their operations, making themselves generally more viable as world competitors in 1983, he said.

Political Actions Undermine Evolution

Industrial Age in Trouble: Toffler

By Bill Laberis
CW Staff

NASHVILLE, Tenn. — Echoing a thesis propounded at increasingly more computer industry conferences, Alvin Toffler charged that present congressional and administration actions are threatening to subvert the evolution of industrial societies into the high-technology era.

Toffler, a noted author, social critic and erstwhile conference keynoter, said further that the computer industry is both driving and being driven by gargantuan changes in the fabric of modern society. He made his remarks at the 58th Management

CW
At Adapso

Conference of the Association of Data Processing Service Organizations, Inc. (Adapso) here recently.

'Little Factory Workers'

With its most recent educational initiatives, the Reagan administration is threatening to turn today's students "into little factory workers for factories that aren't going to be there when they enter the work force," Toffler said.

In addition, government-supported job training programs are the "product of the industrial era and are altogether too narrow," he continued.

Thus, what Toffler called an inevitable movement to a high-technology society is being stifled by inadequate training and weakened by an educational system geared toward "an industrial system that is clearly breaking up around the world."

Events within the computer industry over the past 20 years are emblematic of the much larger changes affecting modern society, Toffler said. Where, in the past, computer systems were massed around highly

CW Photo by B. Laberis

Alvin Toffler

centralized DP departments controlling big mainframes, systems and data bases today are increasingly accessible to more individuals who perform custom applications.

Shedding Remnants

A societywide movement away from mass production and mass distribution is also seen clearly within the computer industry, Toffler continued. Vendors are becoming niche-oriented, catering to the demand for custom applications of both hardware and software. The biggest vendors are becoming less vertically integrated, with industry giants like IBM looking to third-party vendors for hardware, software and some systems support.

Meanwhile, other giants like AT&T are shedding the remnants of the industrial era, preparing to thrust into what Toffler called the "third wave" of social organization, a phrase he used as a title for a best-selling book on the coming information age.

Within this new age, there will be no survival for the "low-tech" industries, Toffler said. Additionally, the that high-tech industries may be incapable of supplying enough employment during the critical transition to a new social order unless government and private industry work together to develop appropriate educational and vocational training programs.

Tool Fits HP MPE IV

BLUE BELL, Pa. — Sperry Corp. has signed an agreement with Northern Telecom Canada Ltd. to work jointly on developing compatibility among both companies' products in voice, data communications and office automation.

The agreement is similar to one signed by the Computer Systems operations of Sperry and Northern Telecom, Inc. in the U.S., announced last October.

Under the most recent agreement, the companies have agreed to define and develop compatibility between Sperry's Sperrylink office systems and Northern Telecom's SL-1 business communications system.

As part of the U.S. agreement, the companies are operating a development test site at Sperry's communications and terminal headquarters in Salt Lake City, Utah. The test includes the SL-1 interconnected with Sperrylink.

U.S., Partners to Fight Growing Protectionism

PARIS — The U.S. and its major trading partners earlier this month hailed the recent turnaround in the world economy and agreed to fight the growing protectionist movement in many industrialized nations.

In particular, the group wants to reverse protectionism in the U.S., which has threatened to spark a high-technology trade war, particularly with Japan.

Following a high-level meeting here of the Organization for Economic Cooperation and Development (OECD), which includes the U.S., Western European countries, Canada and Japan, the nations' representatives issued a May 10 communique citing "encouraging signs of an upturn [that] have now emerged in several OECD economies."

The document said the central policy task now before the OECD members is ensuring "the transition to sustained noninflationary growth and high employment." The OECD members agreed, the communique said, that "strengthening the open and multilateral trading system" — a major goal of current U.S. foreign policy — "is essential to supporting the recovery and the transition to sustained growth."

The countries "therefore agreed that the economic recovery, as it proceeds, provides favorable conditions which member countries should use, individually and collectively, to reverse protectionist trends and to relax and dismantle progressively trade restrictions and trade distorting domestic measures," the statement said.

Export Control Actions To USSR Hurt U.S.: OTA

(Continued from Page 99)

The study noted that many of the restricted goods and services are available to the Soviets from other Western countries, charging further "there is no evidence that [Western] allied nations are about to renounce their fundamental beliefs about East-West trade."

In the meantime, U.S. controls make American firms seem unreliable sources in the international market, the report maintained, saying "concern over possible interruption of future transactions may produce a chilling effect on the climate in which U.S. firms operate and on the business decisions they make."

Politically, OTA added, U.S. efforts to curb such trade have hurt this country's relations with its allies. The report said "Europeans have charged that these [U.S.] foreign policy controls have been implemented in a hypocritical and unfair manner."

Noting that U.S. trade controls are aimed largely at denying the Soviet Union critical military technology, OTA said there is no doubt the Russians have benefitted from Western technology acquired both legally and illegally. But, the report continued, "it is rare to find examples of technologies from the West which the USSR could not have produced itself, albeit with delays."

On the other hand, OTA said, export controls are viewed by some as fundamental tools in East-West relations, and in this view it is often important to express displeasure with Soviet actions.

To the current administration, "trade with the Soviet Union is no longer seen as in part an opportunity for forging peaceful ties, but rather exclusively as the means by which the West is contributing to the strength — and hence the threat — of a country it has every reason to distrust," the report said.

No matter which view is argued, OTA said, "important components of the foreign-trade balance sheet are indirect and unquantifiable, and weighing their importance relative to the political and national security consequence of trade is a highly subjective matter."

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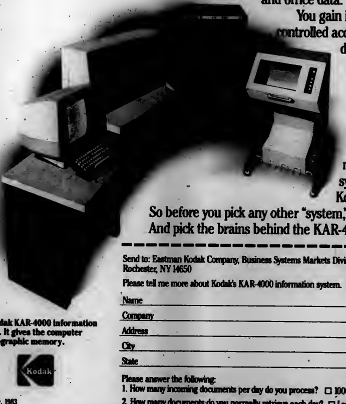

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Nickels & Dimes

IPL Systems, Inc. has reported revenues of $2.9 million and a net loss of $247,000 for the first quarter ending April 2. Loss per share was 5 cents, compared with a gain of 4 cents for the same period last year.

$ $ $

Computervision Corp. has reported revenues of $90 million for the first quarter ending March 31, an increase of 14% over last year's first quarter. Net income for the period was $7.8 million or 25 cents per share, compared with $9.4 million or 35 cents per share for last year.

$ $ $

Tandem Computers, Inc. has reported revenues for the six months ending March 31 were $191 million, a 31% increase over the same period for fiscal 1982. Net income for the period reached $13 million or 34 cents per share compared with $14 million or 36 cents per share for last year.

$ $ $

Hogan Systems, Inc. has reported net earnings of $3.7 million on revenues of $17.1 million for the year ending March 31, compared with net earnings of $1.1 million on revenues of $8.3 million for the previous year.

$ $ $

M/A-Com, Inc. has reported record orders for the second quarter ending April 2, but earnings per share were down 42% from the second quarter 1982. Income for the quarter was $7.2 million or 19 cents per share, compared with $11.9 million or 31 cents per share for last year.

$ $ $

Rolm Corp. has announced record orders of $146 million, an increase of 42% over third quarter 1982. Sales were up 24% to $125 million, and net income grew 14% to $8.7 million.

$ $ $

Centronics Data Computer Corp. has announced net sales of $43.7 million for the first quarter ending April 3, compared with $26.3 million for the comparable period in 1982 and $41.5 for the previous quarter ending Jan. 2. Net earnings for the quarter were $204,000, compared to a loss of $2.1 million for 1982 and a loss of $5.1 million for the previous quarter.

$ $ $

Fortune Systems Corp. has announced revenues for the first quarter ending April 1 were $20.7 million, and net income was $3.3 million or 17 cents per share.

$ $ $

Electronic Data Systems Corp.'s revenues for the quarter ending March 31 were $168.2 million, up 33% over the same period in 1982, and profits were up 23% to $14.8 million.

Mergers & Acquisitions

Charles River Data Systems, Inc., Natick, Mass., has sold its line of DEC-compatible peripherals and systems to **Dataram Corp.** of Cranbury, N.J. Details of the sale were not disclosed.

• • •

Chromatics, Inc., Tucker, Ga., has acquired **Caeco**, a Salt Lake City, Utah, developer of design software for customized very large-scale integration.

• • •

Northern Telecom, Inc. has acquired the large private branch exchange business of **Business Telephone Systems of America, Inc.**, Columbus, Ohio.

• • •

Computer Task Group, Inc., Buffalo, N.Y., has acquired **Diversified Systems, Inc.**, a professional services firm with headquarters in St. Louis.

• • •

Anacomp, Inc., Indianapolis, has acquired the products and customer base of **Custom Medical Systems** of San Rafael, Calif.

Forecasts & Findings

CAE Terminals in Demand

The increasing complexity of engineers' work, coupled with a shortage of engineering talent, will spur a demand for computer-aided engineering (CAE) workstations, according to **Engineering and Scientific Microcomputers and Workstations** by International Resource Development, Inc. (IRD).

The installed base of CAE workstations should rise from its current level of 8,800 to over 275,000 by 1993, the study predicted. Other factors seen influencing the growing demand for CAE workstations include reduction in available time to develop a product, the wage cost of engineers, increased documentation and product safety requirements and a substantial increase in computing power at a significant cost reduction.

Priced at $985, the study is available from IRD, 30 High St., Norwalk, Conn. 06851.

Micro Mart Climb Forecast

The personal computer software market reached $900 million in 1982 and is expected to climb to $8 billion by 1987, according to a Future Computing, Inc. study, **Personal Computer Software Market Analysis**.

Entertainment will be the largest and most competitive market due to repeat sales. Business sales will grow from $180 million to over $1 billion in 1987, the study said. Educational software, on the other hand, is still in its infancy and will grow from a $60-million base in 1982 to over $900 million in 1987.

Priced at $1,195, the study is available from Publications Sales, Future Computing, 900 Canyon Creek Center, Richardson, Texas 75080.

Executive Corner

- **Ray Maturi** has been named president and chief operating officer of Systematics, Inc.
- **Bartley J. Carlson** has joined National Systems Laboratories, Inc. as chief executive officer.
- **John M. Ryan**, chief executive officer of 515 Corp., has been elected chairman of the board. He has been succeeded as president by **James L. Mann.**
- **Charles E. Exley**, president of NCR Corp. since 1976, has been named chief executive officer. The board of directors also has established an office of the chief executive, comprised of three executive vice-presidents: **William F. Buster,** formerly senior vice-president, development and production group; **Manuel Garcia**, formerly senior vice-president; and **Donald J. Herman**, formerly chairman of NCR Comten, Inc.
- **Harry B. Traylor** has been promoted to vice-president, federal projects operations, at Sperry Corp.
- **Richard H. Bierly** has been appointed vice-president, human resources, and **Edwin F. Carlson** has been appointed vice-president, business and office automation systems, for Burroughs Corp.

Terminal Mart on the Rise

The portable terminal market shipment rate is expected to exceed 450,000 units by 1987. Portable teleprinters currently account for 84.7% of those shipments. They will lose some of that share by 1987, but they will still retain the dominant market share, according to **The Portable Briefcase Computer and Terminal Industry 1983-1987: A Strategic Analysis** by Venture Development Corp.

The leader in the portable teleprinter market segment is Texas Instruments, Inc., followed by Trendcom, Inc. and Computer Devices, Inc., the study said. There are few manufacturers in the portable display market. With a limited number of new entrants in the market, prices are expected to decline rapidly on products in this area.

The report is priced at $2,790 from Venture Development, 1 Washington St., Wellesley, Mass. 02181.

Peripheral Sales to Double

The minicomputer peripherals market, driven by technical breakthroughs, will more than double in real sales volume between 1983 and 1987, with 8-in. and 14-in. Winchester disk drives becoming the biggest category, according to **Minicomputer Peripherals Market** by Frost & Sullivan, Inc.

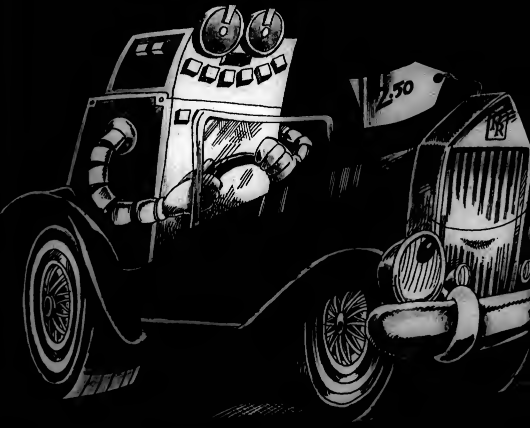
The 1987 market for noncaptive peripherals is projected to total $6.5 billion, up $2.7 billion in 1982 and $3.1 billion in 1983. However, the study warned that features and price competition may surpass that in the industry generally.

Winchester disk drives, with $292 million in 1982 sales and $401 million projected for 1983, are seen as both the largest dollar growth and highest volume peripherals by 1987. However, the 8-in. floppy disk drive category will remain so through 1987, the report said.

Disk pack drives, on the other hand, are seen as the only peripheral declining in sales volume.

The report (#A1082) costs $1,275, from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



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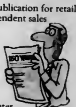

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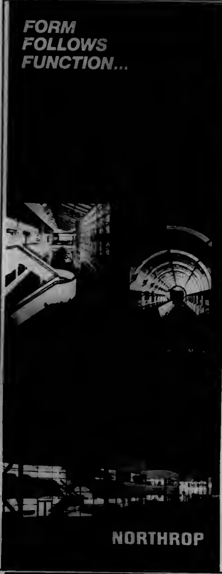

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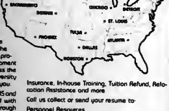

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A full time research job is available in an academic setting in a Center devoted entirely to population studies and involved with statistics and demographic research procedures. The principal focus of the research is population projection involving user oriented, data base management in order to provide multi-stage, simultaneous, inter-regional projections for the United States (using the censuses of 1940 through 1980), Canada and Europe. The system requires continuous [illegible] $15,000 [illegible] per year. Requires a Master's Degree in Computer Science, undergraduate training focused in social sciences, and at least a year's experience in a [illegible] occupation involving census data and geographic concepts. Send resume to MESC, 7310 Woodward Avenue, Room 415, Detroit, Michigan, 48202; refer to number 15483. (Ad paid for by employer).

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Here's the data you need to know to place your ad:

The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue data) Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logos or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

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First-time advertisers must send payment along with their ad.

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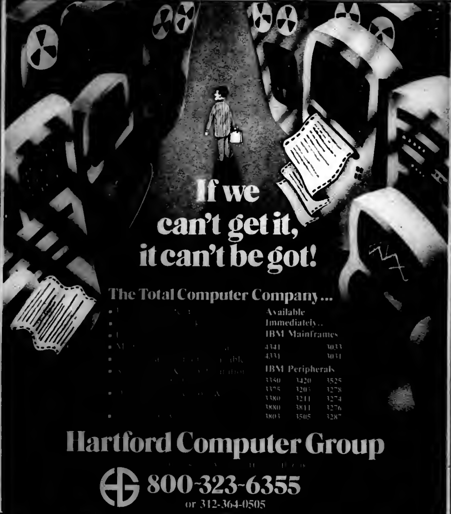

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MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 628 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

General Request for Proposal Number 838, due Tuesday, June 28, 1983, 3:30 P.M. This is a general RFP for the acquisition of magnetic card typewriters for the State of Mississippi through June of 1984.

General Request for Proposal Number 894, due Tuesday, June 28, 1983, 3:30 P.M. This is a general RFP for the acquisition of standalone word processing equipment for the State of Mississippi through June of 1984.

General Request for Proposal Number 896, due Tuesday, June 28, 1983, 3:30 P.M. This is a general RFP for the acquisition of shared-logic word processing systems for the State of Mississippi through June of 1984.

Request for Proposal Number 849, due Tuesday, June 14, 1983, 3:30 P.M., for the acquisition of a CICS online testing software package to run on Amdahl V8-II, Amdahl V8 environment running MVS/SP and using ACF/VTAM and CICS versions 1.5 and 1.6.

General Request for Proposal Number 841, due Thursday, June 30, 1983, 3:30 P.M. This is a general RFP for the acquisition of new or used memory, disk storage, video terminals, printers and related peripheral equipment which is compatible with IBM's System/34 for the State of Mississippi through June of 1984.

General Request for Proposal Number 848, due Thursday, June 30, 1983, 3:30 P.M. This is a general RFP for the acquisition of new or used video display terminals, printers and related peripheral equipment utilizing Burroughs Poll Select Protocol for the State of Mississippi through June of 1984.

General Request for Proposal Number 883, due Thursday, June 30, 1983, 3:30 P.M. This is a general RFP for the acquisition of Univac compatible CRT's, printers, controllers and multiplexors for the State of Mississippi through June of 1984.

General Request for Proposal Number 884, due Thursday, June 30, 1983, 3:30 P.M. This is a general RFP for the acquisition of new or used printing, interpreting keypunch verifiers for the State of Mississippi through June of 1984.

Request for Proposal Number 846, due Thursday, June 23, 1983, 3:30 P.M., for the acquisition of a computer system with RJE, data entry, word processing, TSO and CICS to function as an SNA node communicating with an Amdahl V8-II and an Amdahl V8 running under MVS.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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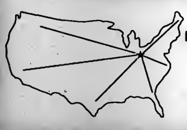

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The Purchase of Services to design, install, and implement an on-line real-time Procurement and Inventory Control System (PICS) for Dade County Transportation Administration.

All Proposals will be opened on Tuesday, June 21, 1983 at 2 pm or shortly thereafter.

Consultants shall be required to comply with all applicable Equal Opportunity Laws and Regulations.

All Offerers shall be required to certify that they are not on The Comptroller General's of ineligible contractors.

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A Pre-Bid Conference to discuss and thoroughly clarify the specifications and requirements of the Bid will be held at the Dade County Administration Building, 12th Floor Conference Room, 140 West Flagler Street, Miami, Florida on June 1, 1983 at 9 am.

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Metropolitan Dade County reserves the right to accept or reject any and all bids and to waive any irregularities and informalities in procedure and to award the contract on such basis as the County Deems in its best interest.

Proposal documents may be obtained by calling Mr. Paul Rombo at (305) 579-5269.

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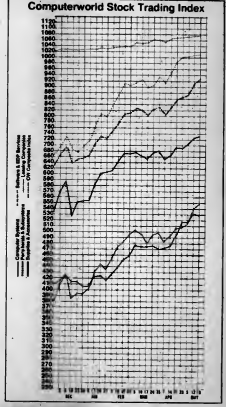

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 18, 1983

All statistics compiled computed and formatted by
TRADE QUOTES INC
Cambridge Mass 02139

EXCH		1982-83 RANGE (1)	CLOSE MAY 18 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	17- 51	50 1/4	+1 1/2	+3.2
N	BURROUGHS CORP	26- 52	50 7/8	+ 7/8	+1.7
O	COMPUTER AUTOMATION	7- 17	12 7/8	+ 1/4	+2.0
A	COMPUTER CONSOLES	18- 44	42 3/4	+ 3/4	+1.7
N	CONTROL DATA CORP	21- 58	54 7/8	+ 7/8	+1.6
N	CRAY RESEARCH INC	30- 48	42	+ 1/8	+0.3
N	DATA GENERAL CORP	30- 72	57 1/2	-1 1/4	-2.1
N	DATAPOINT CORP	11- 28	24 1/2	- 1/8	-0.5
N	DIGITAL EQUIPMENT	62-132	113 1/4	+ 1/4	+0.2
A	EECO INC	8- 14	14 1/8	+ 3/8	+2.7
N	ELECTRONIC ASSOC.	5- 12	10 3/4	+ 3/4	+7.5
N	FLOATING POINT SYST	18- 38	36 1/4	+1 3/4	+5.0
N	FOXBORO	22- 43	38 1/2	+2 3/4	+7.4
O	FULCRUM COMP DEP	1- 2	1/4	0	0.0
O	GENERAL AUTOMATION	3- 13	11 1/8	- 3/8	-3.3
N	HARRIS CORP	20- 51	43 1/4	-1	-2.2
N	HEWLETT-PACKARD CO	36- 87	83 1/2	+3 7/8	+4.8
N	HONEYWELL INC	80-134	117 1/2	-3 5/8	-3.0
N	IBM	57-118	111 3/4	-3 3/4	-3.3
O	IPL SYSTEMS INC	5- 11	8 3/4	- 1/2	-5.4
O	MAGNUSON COMP SYSTS	2- 8	3	0	0.0
N	MANAGEMENT ASSIST	7- 18	15 1/8	+ 3/8	+2.5
O	MINI-COMPUTER SYST	1- 3	1 7/8	0	0.0
N	MODULAR COMPUTER SYS	8- 18	14 1/8	+ 1/2	+3.6
N	MOHAWK DATA SCI	10- 18	15 3/8	0	0.0
N	NCR	38-121	118	- 1/2	-0.4
N	PERKIN-ELMER	17- 33	27	+1 3/8	+5.4
N	PRIME COMPUTER INC	16- 48	38 3/4	+1 3/8	+3.7
N	SPERRY CORP	31- 38	36 1/2	-1	-2.6
O	TANDEM COMPUTERS INC	14- 34	31 7/8	+3	+10.3
N	TEXAS INSTRUMENTS	71-176	146 1/2	-2	-1.3
A	WANG LABS "B"	12- 41	38 3/8	0	0.0
A	WANG LABS "C"	11- 41	38 1/2	- 1/8	-0.3
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	22- 45	44	-1	-2.2
O	COMDISCO INC	7- 33	32 7/8	+1 1/4	+3.9
O	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 3	1/2	0	0.0
O	CONTINENTAL INFO SYS	8- 24	22 1/2	+ 1/4	+1.1
O	DPF INC	9- 14	13 3/4	+ 5/8	+4.7
O	ITEL	1- 2	1 1/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
O	U.S. LEASING	18- 47	43 3/4	-1 1/4	-2.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1982-83 RANGE (1)	CLOSE MAY 18 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	3	0	0.0
O	ADVANCED SYSTEMS INC	8- 28	24	+2 1/2	+9.8
O	AGS COMPUTERS INC	7- 24	23 3/4	+1 1/2	+6.7
O	AMERICAN SOFTWARE	22- 39	27 1/4	- 1/2	-1.8
N	ANACOMP INC	8- 23	19 3/8	- 3/4	-3.7
O	ANALYSTS INTL CORP	5- 14	13 1/2	+3	+28.5
O	APPLIED DATA RES.	8- 33	33	+1 1/4	+3.9
O	ASK COMPUTER SYSTEMS	12- 36	33 1/2	+1 1/4	+3.9
O	[illegible] CORP INC	1- 7	6 1/8	+ 1/2	+8.8
N	AUTOMATIC DATA PROC	21- 42	39 3/8	-2 1/8	-5.1
O	CGA COMPUTER ASSOC	5- 16	14	+ 1/2	+3.7
O	COMPUTER ASSOC INT'L	12- 61	57 1/2	-2 1/2	-4.1
O	COMPUTER HORIZONS	8- 25	25 1/2	+3 1/2	+15.9
O	COMPUTER NETWORK	4- 10	9 3/4	- 3/8	-3.7
N	COMPUTER SCIENCES	11- 23	18 1/2	-1	-5.1
O	COMPUTER TASK GROUP	8- 22	22 1/4	+ 1/4	+1.1
O	COMPUTER USAGE	2- 27	17	-2 3/4	-13.9
O	COMPUTONE SYSTEMS	13- 36	18	-2 1/2	-11.8
O	COMSERV CORP	10- 20	14 1/4	+1 1/4	+9.6
O	COMSHARE	8- 13	10 5/8	+ 1/8	+1.1
O	CULLINET SOFTWARE	12- 43	41 1/2	- 3/4	-1.7
O	CYCARE SYSTEMS INC	8- 26	25 3/4	+1 3/4	+7.2
O	DATA DIMENSIONS INC	1- 2	3/4	0	0.0
O	DATATAB	0- 2	3/4	0	0.0
O	DYATRON CORP	2- 4	3 3/4	+ 3/4	+25.0
N	ELECTRONIC DATA SYST	18- 65	64 1/4	+2	+3.1
O	INFORMATICS INC	10- 32	31 3/4	+1 1/2	+4.9
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPM COMPUTER MARKET.	1- 3	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 13	11 1/2	- 1/4	-2.1
A	LOGICON	12- 34	27 1/2	+ 1/4	+0.9
O	MGMT SCI AMER INC	8- 31	25 3/4	- 3/4	-2.4
O	MATHEMATICA INC	12- 26	25 3/4	+1 3/4	+7.2
O	MATHEMATICAL APP GRP	12- 22	18 3/4	0	0.0
O	NATIONAL DATA CORP	8- 28	23 1/2	-1 1/4	-5.0
O	PANSOPHIC SYSTEMS	8- 29	25 1/4	+1 1/2	+6.3
O	PLANNING RESEARCH	8- 18	18	+1	+5.8
O	POLICY MGMT SYSTS CP	36- 54	52 1/4	+ 1/4	+0.4
O	PROGRAMMING & SYS	1- 4	3 1/4	0	0.0
O	REYNOLDS & REYNOLDS	17- 44	42	-1 1/2	-3.4
O	SEI CORP	11- 33	32 1/2	+ 1/4	+0.7
O	SHARED MEDICAL SYST	13- 37	36 7/8	+1 7/8	+5.3
O	SCIENTIFIC COMPUTERS	6- 13	12	0	0.0
O	SOFTWARE AG	5- 17	8 1/2	+ 1/8	+1.5
O	TYMSHARE INC	12- 36	23 1/8	- 3/8	-1.6
O	URS CORP	5- 14	10 3/8	+ 1/8	+1.2
O	WYLY CORP	7- 18	14 1/8	+2 1/8	+17.7
	PERIPHERALS & SUBSYSTEMS				
O	AM INTERNATIONAL	2- 8	6 1/8	+ 3/8	+6.5
O	ANDERSON JACOBSON	8- 36	18 7/8	- 5/8	-3.2
O	AUTO-TROL TECHNOLOGY	8- 21	18 1/2	+ 5/8	+3.4
O	BANCTEC INC	7- 24	18 1/4	0	0.0
O	BEEHIVE INT'L	4- 13	13 7/8	- 3/8	-2.6
A	BOLT BERANEK & NEW	18- 66	64 3/8	+6 5/8	+10.8
O	CAMBEX CORP	2- 4	1 7/8	- 1/8	-6.2
O	CENTRONICS DATA COMP	8- 22	20 1/4	+ 1/2	+2.5
O	CETEC CORP	4- 10	6 3/8	+ 1/2	+8.4
O	COGNITRONICS	2- 14	13 1/2	+1 3/8	+13.2
O	COMPUTER CONSUL.	1- 2	1 3/4	0	0.0

EXCH		1982-83 RANGE (1)	CLOSE MAY 18 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	4- 21	14 1/8	- 7/8	-5.8
O	COMPUTER TRANSCEIVER	4- 13	10 3/4	- 3/4	-6.5
O	COMPUTERVISION CORP	18- 45	45	+3 1/4	+7.7
O	CONRAC CORP	21- 38	37 1/2	+ 1/2	+1.3
O	DATA ACCESS SYSTEMS	1- 4	5/8	0	0.0
O	DATAPRODUCTS CORP	16- 41	22 1/8	- 1/8	-0.5
O	DATARAM CORP	8- 12	8 3/8	- 3/4	-7.4
O	DATUM INC	2- 15	13 5/8	+ 3/8	+2.8
O	DAVID JAMISON CARLYL	2- 7	3 7/8	+ 5/8	+19.2
O	DECISION DATA COMPUT	3- 15	14 7/8	+1 1/8	+8.1
O	DELTA DATA SYSTEMS	1- 4	3 3/8	- 1/2	-12.1
N	ELECTRONIC M & M	3- 16	9 1/2	+ 3/4	+8.6
O	EVANS & SUTHERLAND	18- 50	37	-4 3/4	-11.3
O	GANDALF TECHNOLOGIES	10- 22	14	+ 1/4	+1.8
O	GEN'L DATA COMM IND	8- 28	24 7/8	+3	+13.7
O	GENERAL TERMINAL CP	1- 2	1	+ 1/4	+33.3
O	GREAT SOUTHWEST IND	2- 8	7 3/4	+1 3/8	+22.2
N	HAZELTINE CORP	22- 78	78 1/2	-1 5/8	-2.0
O	ICOT CORP	3- 10	7 1/8	- 1/8	-1.7
O	INFORMATION INTL INC	10- 22	18	+ 1/4	+1.4
O	INTEL CORP	21- 57	54 1/4	-1	-1.8
O	IPL SYSTEMS INC	5- 11	8 3/4	- 1/2	-5.4
A	LUNDY ELECTRONICS	7- 18	16 7/8	- 3/8	-2.2
A	MAI DATA CORP	14- 30	18 1/2	- 7/8	-4.5
O	NETWORK SYSTEMS CORP	8- 27	24 1/2	-1 7/8	-7.1
O	OMEX	3- 8	5 1/2	0	0.0
N	PARADYNE CORP	20- 36	24 3/4	- 1/8	-0.5
A	PENRIL CORP	7- 13	11 3/4	0	0.0
O	RAMTEK CORP	12- 28	23 1/2	0	0.0
N	RECOGNITION EQUIP	4- 17	16	+1 1/8	+7.6
O	SCAN DATA	1- 3	1 1/8	0	0.0
N	STORAGE TECHNOLOGY	18- 35	22 1/2	- 3/8	-1.6
O	SYKES DATATRONICS	8- 27	18	+ 3/8	+2.1
O	T BAR INC	7- 14	10 1/2	+ 1/8	+1.2
O	TAB PRODUCTS CO	8- 28	26 1/2	- 3/4	-2.7
A	TEC INC	8- 12	8	- 5/8	-7.2
N	TEKTRONIX INC	34- 75	70	+1 7/8	+2.8
N	TELEX	8- 27	22	-1 1/4	-5.3
O	TESDATA SYSTEMS CP	3- 11	8 1/2	- 1/8	-1.4
O	TIMEPLEX INC	7- 28	22 1/4	+ 1/2	+2.2
O	VISUAL TECHNOLOGY	8- 29	26 1/4	+ 1/2	+1.9
O	WILTEK INC	1- 4	3 5/8	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 27	24 5/8	-1 1/4	-4.8
O	BALTIMORE BUS FORMS	1- 3	3/8	0	0.0
O	BARRY WRIGHT	12- 27	25 1/4	- 7/8	-3.3
O	CYBERMATICS INC	1- 1	1 1/8	0	0.0
A	DUPLEX PRODUCTS INC	13- 26	24 3/4	- 3/8	-1.4
N	ENNIS BUS. FORMS	18- 36	35 3/8	- 1/4	-0.7
N	3M COMPANY	54- 84	81 3/4	- 1/2	-0.6
N	MOORE CORP LTD	36- 51	51	0	0.0
O	NASHUA CORP	8- 19	18 1/2	+ 1/2	+2.7
O	STANDARD REGISTER	32-103	103	+2 1/2	+2.5
N	WALLACE BUS FORMS	11- 38	38	- 1/2	-1.3

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